

Curriculum Vitae di G. F. Tartarelli

G. F. Tartarelli e' Primo Ricercatore INFN presso la Sezione di Milano dal 2006 . In precedenza ha ottenuto una Laurea in Fisica presso l'Universita' degli Studi di Pisa nel 1990 e un Dottorato di Ricerca in Fisica all'Universita' di Milano nel 1996. E' stato "Research Fellow" al CERN per 2 anni (1997-1998) ed e' diventato ricercatore INFN presso la Sezione di Milano nel 2001.

Ha condotto attivita' di ricerca nel campo della fisica delle particelle elementari, con esperimenti agli acceleratori di particelle. Ha lavorato per la Collaborazione CDF al Tevatron del Fermilab (USA) dal 1989 al 1996 e successivamente con la Collaborazione ATLAS all'LHC del CERN. In ATLAS ha partecipato alla costruzione del calorimetro ad Argon Liquido ed ad analisi di fisica di fotoni "prompt" e del bosone di Higgs. Oggi e' impegnato nell'upgrade dell'elettronica del calorimetro ad Argon Liquido sia per l'upgrade di Fase 1 per il Run 3 di LHC (che iniziera' nel 2021) che per l'upgrade di Fase 2 per il Run 4 (2025).

Dal 2009 e' responsabile del gruppo di calorimetria ad Argon Liquido di Milano e in Atlas-Italia e dal 2012 e' responsabile locale del gruppo ATLAS di Milano.

E' autore di 977 pubblicazioni, con 60493 citazioni e h-index pari a 106 (fonte Scopus)

09/06/2020

Handwritten signature of Giuseppe Ferrotto in black ink.

Curriculum vitae

PERSONAL INFORMATION

Family name, First name: Mattei Ilaria

Researcher unique identifier: ResercherID: T-8988-2017

mail: ilaria.mattei@mi.infn.it

EDUCATION

1/2012-12/2014 **Ph.D.** in Physics “*A novel on-line dose monitoring technique tailored for Particle Therapy*” Supervisors: Prof. F. Ceradini and Prof. V. Patera
Università Roma Tre, Roma, Italy - Laboratori Nazionali di Frascati, Frascati, Italy

10/2008-9/2011 **Master Degree** in Physics “*Misura dello spettro dei fotoni prompt emessi in trattamenti carboterapici*” (110/110 cum laude) Supervisor: Prof. R. Faccini
Sapienza Università di Roma, Roma, Italy

9/2005-10/2008 **Bachelor Degree** in Physics “*Risultati recenti sul fattore di forma elettromagnetico del protone*” (Full mark) Supervisor: Prof. C. Bini
Sapienza Università di Roma, Roma, Italy

CURRENT AND PREVIOUS POSITIONS

6/2019- Third-level researcher (permanent position) of INFN - Sezione di Milano

4/2017-5/2019 Researcher Post-Doc “*Study of nuclear fragmentation in hadrontherapy*”
Responsabile Dott. G. Battistoni
Istituto Nazionale Fisica Nucleare (INFN) - Università Statale di Milano, Italy

4/2015-3/2017 Researcher Post-Doc “*Nuclear techniques for in-vivo monitoring of Hadrontherapy*”
Responsabile Dott. G. Battistoni
Istituto Nazionale Fisica Nucleare (INFN) - Università Statale di Milano, Italy

APPROVED and FUNDED PROJECTS as member of a research group

2017 – 2019 “*MoVe-IT - Modelling and Verification for Ion beam Treatment planning*” Call G5 INFN. I am part of the MoVe-IT collaboration, in particular in WP1 and WP4.

2013 – 2016 “*INSIDE*” Development of monitoring for charged particles. Funding: 977.9 keuro. MIUR PRIN 2011 I am part of WP5 “*Dose Monitoring for Hadrontherapy*” and WP6 “*Nuclear Fragmentation Studies for Hadrontherapy*”.

TEACHING ACTIVITIES

2019-2020 **Teacher** of the “*Monte Carlo methods*” course for the Specialization in medical physics. Università Statale di Milano, Italy - Physics Department

3-2019 **Teacher** of the third module of “*Introduction to the medical physics*” course held by Prof. A. Lascialfari. Università Statale di Milano, Italy - Physics Department

2017-2018 **Tutor** for the course of “*Physics laboratory with elements of statistics*” held by Prof. L. Perini. Università Statale di Milano, Italy - Physics Department

28/5-1/6/2018 **Teacher** of the FLUKA course at the 20th FLUKA Beginners Course, Stellenbosch University, Stellenbosch, South Africa.

8-12/05/2017 **Teacher** of the FLUKA course at the 19th FLUKA Beginners Course, Pohang Accelerator Laboratory (PAL), POSTECH, South Korea.

SUPERVISION OF STUDENTS AND POSTDOCTORAL FELLOWS

2014 – 2018 **Supervised:** 3 Master Students and several Bachelor Students from different universities: Università Statale di Milano, Italy - Università degli studi di Trieste, Italy - Sapienza Università di Roma, Italy

RESEARCH PERFORMANCES

My research focuses on the Nuclear Reactions for Particle Therapy applications. The Particle Therapy field offered me the opportunity to work with different monitoring strategies exploiting secondary products (most of all tracking detectors) with a growing independency in leading activities.

- h index of 11 with more than 30 publications in refereed international journals for a total of more than 100 citations (excluding self citations of all authors, database: <http://www.scopus.com>);
- 6 publications in refereed international journals as first or second author;
- 1 Granted patent request for medical application: “*Intraoperative detection of tumour residues using beta- radiation and corresponding probes*” WO 2014118815 A2;
- More than 7 presentations and seminars at international conferences and workshops;
- **Dic 2018: Award funding for six projects presented by young researchers - INFN CSNV**

MAJOR COLLABORATIONS with Therapy Centres

Since 2016 **APSS - Trento Proton Therapy Center.** Collaboration activities with the proton beam facility: experimental measurements and data analysis;

Since 2016 **CNAO - Centro Nazionale di Adroterapia Oncologica, Pavia.** Member of the INSIDE project: I work for the integration of the *Dose Profiler* into the clinical trial with patients.

March 2016 - August 2018 Member of the OTERO project: “Sequenziatore innovativo per l’ottimizzazione di erogazione di piani Adroterapici e di sistemi di Dosaggio (OTERO)”, co-funded by the Regione Lombardia, PROGRAMMA OPERATIVO REGIONALE 2014-2020, BANDO LINEA R&S PER AGGREGAZIONI, Leader: **CNAO**, Participants: INFN Milano, Elesolutions srl, Hifuture srl

March 2017 - June 2018 Member of the scientific committee of the Piano Fondimpresa AVI/143/16 - “M.IN.T.A. - Miglioramento continuo e INnovazione Tecnologica nell ‘Adroterapia”, developed within the **CNAO** center.

2013-2015 **HIT - Heidelberg Ion-Beam Therapy Center.** Measurements planning, commissioning, data taking and analysis of the *NCS@HIT* experiment with proton, ^{12}C , ^4He , and ^{16}O beams of energies of interest for PT applications (FP7 ULICE).

2012-2015 **GSI Helmholtzzentrum für Schwerionenforschung of Darmstadt.** Collaboration with the biophysics group (M. Durante) for the installation, commissioning, data taking and analysis of an experiment performed using ^{12}C beams of therapeutic energy

2011-2012 **CATANA Centro di AdroTerapia ed Applicazioni Nucleari Avanzate, Catania - LNS (Laboratori Nazionali del Sud)** Collaboration activities with the proton beam facility: experimental commissioning, data taking and data analysis;

TRACK RECORD

I am involved in the research field of nuclear and elementary particles physics applied to medicine. I focused my activities in Particle Therapy (PT) application, in particular for the development of beam range and dose monitoring purposes, but also in the cross section measurement that are of interest for

PT. My activity is focused on the experimental data analysis and Monte Carlo simulations (using the FLUKA code) and simulated data analysis, with a particular interest in the optimisation of detectors design and performances.

Scientific publications (all present in scopus database):

- **Scientific products**
- Granted patent request - WO Patent App. PCT (Patent Cooperation Treaty), PCT/IT2014/000025, for a “*Intraoperative detection of tumour residues using beta- radiation and corresponding probes*” WO 2014118815 A2 - <http://www.google.com/patents/WO2014118815A2?cl=en>
- FOOT CDR Conceptual Design (Alexandrov A et al.) Technical Report (2017)
doi:10.13140/rg.2.2.28904.78080
- Publications - List of my publications on referred international journals. Publications are reported in inverted chronological order and grouped in 3 different topics. The papers where I am the first or second author are marked as follow: I.Mattei.

Innovation in online Monitoring

1. G. Traini, I. Mattei et al. “*Review and performance of the Dose Profiler, a particle therapy treatments online monitors*” *Physica Medica* 65 (2019) 84–93, doi:10.1016/j.ejmp.2019.07.010
2. I. Mattei et al. “*Scintillating fiber devices for Particle Therapy applications*” *IEEE TNS* (2018), doi:10.1109/TNS.2018.2843179
3. Battistoni G et al. “*Design of a tracking device for on-line dose monitoring in hadrontherapy*” *NIM A* (2017) ISSN: 0168-9002, doi:10.1016/j.nima.2016.05.095
4. Traini G et al. “*Design of a new tracking device for on-line dose monitor in ion therapy*” *Physica Medica* 34 (2016) 18-27, doi:10.1016/j.ejmp.2017.01.004
5. Muraro S et al. “*Monitoring of hadrontherapy treatments by means of charged particle detection*” *Review Article Front. Oncol.* 6 (2016) 177, doi:10.3389/fonc.2016.00177
6. Muraro S et al “*MC codes and range monitoring in particle therapy: The case of secondary charged particles*”, *Physica Medica* (2017) 42, doi:10.1016/j.ejmp.2017.09.143”
7. Battistoni G et al. “*Measurement of charged particle yields from therapeutic beams in view of the design of an innovative hadrontherapy dose monitor*” *JINST* (2015) ISSN: 1748-0221, doi:10.1088/1748-0221/10/02/C02032
8. Battistoni G “*Realization of an innovative Dose Profiler for online range monitoring in particle therapy treatments*” *Radiotherapy and Oncology* (2016) 118, Supplement 1, S1S118, doi:10.1016/S0167- 8140(16)30212-2.
9. INSIDE Collaboration (M. Marafini et al). “*The INSIDE Project: Innovative Solutions for In-Beam Dosimetry in Hadrontherapy*” *Acta Phy. Pol. A* 127 (2015) 5 ISSN: 0587-4246, doi:10.12693/APhysPolA.127.1465
10. INSIDE Collaboration (F. Pennazio et al.) “*A Study of Monitoring Performances with the INSIDE System*” *Acta Phy. Pol. A* (2015) ISSN: 0587-4246, doi:10.12693/APhysPolA.127.1468

Nuclear Physics and Particle Therapy

11. Mattei I et al. “*Measurement of ^{12}C Fragmentation Cross Sections on C, O and H in the Energy Range of interest for Particle Therapy Applications*” IEEE TRPMS (2020) 1-14 doi: 10.1109/TRPMS.2020.2972197
12. Rucinski A et al. “*Secondary radiation measurements for particle therapy applications: Charged particles produced by ^4He and ^{12}C ion beams in a PMMA target at large angle*” PMB 63 (2018) 055018, doi:10.1088/1361-6560/aaa36a
13. Marafini M et al. “*Secondary radiation measurements for particle therapy applications: nuclear fragmentation produced by ^4He ion beams in a PMMA target*” PMB 62 (2017) 4 1291, doi:10.1088/1361-6560/aa5307
14. Mattei I et al. “*Secondary radiation measurements for particle therapy applications: Prompt photons produced by ^4He , ^{12}C and ^{16}O ion beams in a PMMA target*” PMB 62 (2017)1438-1455, doi:10.1088/1361-6560/62/4/1438
15. Mattei I et al. “*Addendum: Measurement of charged particle yields from PMMA irradiated by a 220 MeV/u ^{12}C beam*” PMB 62 (2017) 843, doi:10.1088/1361-6560/aa8b35
16. Battistoni G et al. “*The FOOT (Fragmentation Of Target) Experiment*” PoS BORMIO2017 (2017) 023, doi:10.22323/1.302.0023
17. Vanstalle M, Mattei I, Sarti A et al. “*Benchmarking Geant4 hadronic models for prompt- γ monitoring in carbon ion therapy*” MEDICAL PHYSICS 44 (2017) 4276-4286, doi:10.1002/mp.12348
18. Patera V et al. “*The FOOT (Fragmentation Of Target) Experiment*” PoS INPC2016 (2016) 128, doi:10.22323/1.281.0128
19. G. Battistoni, I. Mattei, S. Muraro “*Nuclear Physics and Particle Therapy*” Adv. Phys. X (2016) 1, 4 661-686 doi:10.1080/23746149.2016.1237310
20. Giaz A et al “*Fast neutron measurements with ^7Li and ^6Li enriched CLYC scintillators*” NIM A (2016) 825 51–61, doi:10.1016/j.nima.2016.03.090
21. Toppi M et al. “*Measurement of secondary particle production induced by particle therapy ion beams impinging on a PMMA target*” EPJ Web of Conferences (2016) 117, 05007, doi:10.1051/epjconf/201611705007
22. Mattei I et al. “*Prompt-gamma production of 220 MeV/u C-12 ions interacting with a PMMA target*” JINST 10 (2015) P10034, doi:10.1088/1748-0221/10/10/P10034
23. Piersanti L et al. “*Measurement of charged particles yields from PMMA irradiated by 220 MeV/u ^{12}C beam*” PMB 59 (2014) 1857-1872, doi:10.1088/0031-9155/59/7/1857
24. Bellini F et al. “*Extended calibration range for prompt photon emission in ion beam irradiation*” NIM A 745 (2014) 114-118, doi:10.1016/j.nima.2014.01.047
25. Agodi C et al. “*Precise measurement of prompt photon emission from 80 MeV/u carbon ion beam irradiation*” JINST 7 (2012), P03001, doi:10.1088/1748-0221/7/03/P03001
26. C Agodi et al. “*Erratum: Precise measurement of prompt photon emission from 80 MeV/u carbon ion beam irradiation*” JINST 8 (2013) E11002, doi: 10.1088/1748-0221/8/11/E11002
27. Agodi C et al. “*Charged particle's flux measurement from PMMA irradiated by 80 MeV/u carbon ion beam*” PMB 57 (2012) 5667-78, doi: 10.1088/0031-9155/57/18/5667

28. C Agodi et al. “*Corrigendum: Charged particles flux measurement from PMMA irradiated by 80 MeV u-1 carbon ion beam*” PMB 59 (2014) 7563, doi: 10.1088/0031-9155/57/18/5667
29. Agodi C et al. “*Study of the time and space distribution of beta+ emitters from 80 MeV/u carbon ion beam irradiation on PMMA*” NIM B 283 (2012) 1-8, doi:10.1016/j.nimb.2012.04.021
30. Agodi C et al. “*Charged and Neutral Particles Production from 80 MeV/u C-12 ion beam on a PMMA target*” IEEE NSS/MIC (2012), doi:10.1109/NSSMIC.2012.6551312
31. Fiore S et al “*Neutral and Charged Particles’ Flux Measurement for Released Dose Imaging in Hadrontherapy*”, IEEE Nuclear Science Symposium Conference Record, pp. 1275-1278, 2012
32. Agodi C et al. “*Measurement of Prompt Photons and Gamma PET from 80 MeV/u Carbon beam on PMMA target*” IEEE Nuclear Science Symposium Conference Record (2011), doi:10.1109/NSSMIC.2011.6152648

Intra-operative probe

33. Solfaroli Camillocci E et al. “*Intraoperative probe detecting β^- decays in brain tumour radio-guided surgery*” NIM A 845 (2017) 689-692, doi:10.1016/j.nima.2016.04.107
34. Russomando A et al “*Characterization of a detector for β^- radio-guided surgery*” SIF IL NUOVO CIMENTO 39 C (2016) 264.
35. Collamati F et al. “*Toward Radioguided Surgery with beta(-) Decays: Uptake of a Somatostatin Analogue, DOTATOC, in Meningioma and High-Grade Glioma*” JOURNAL OF NUC. MED. 56 (2015) 3-8, doi:10.2967/jnumed.114.145995
36. Camillocci ES et al. “*Polycrystalline para-terphenyl scintillator adopted in a beta(-) detecting probe for radio-guided surgery*” INTERNATIONAL JOURNAL OF MODERN PHYSICS CONFERENCE SERIES 620 (2015) 012009, doi: 10.1088/1742-6596/620/1/012009
37. Camillocci ES et al. “*A novel radioguided surgery technique exploiting beta-decays*” Scientific Report (2014) 4, 4401, doi:10.1038/srep04401
38. Russomando A et al. “*An innovative radio-guided surgery technique for complete resection of tumors*” INTERNATIONAL JOURNAL OF MODERN PHYSICS CONFERENCE SERIES 566 (2014) 012020, doi:10.1088/1742-6596/566/1/012020
39. Angelone M et al. “*Properties of para-terphenyl as detector for alpha, beta and gamma radiation*” TNS (2014) 61, 3, 1483-1487, doi:10.1109/TNS.2014.2322106

- **Conferences and Seminars**

Selection of the most important attended conferences and invited seminars where I presented the results obtained in the medical physics application field.

- (a) 11-14/06 2018 SORMA: XVII - 2018 Symposium on Radiation Measurements and Applications, Ann Arbor (U.S.A.) - “*Neutron and charged particle trackers: applications to Particle Therapy*”

- (b) 18/09-22/09 2017 SCINT 2017 - 14th Int. Conference on Scintillating Materials and their Applications, Chamonix (France) - *“Scintillating fiber devices for Particle Therapy applications”*
- (c) 31/05-4/06 2017 MEDAMI 2017 - V MEDITERRANEAN FORUM ON ADVANCED MOLECULAR IMAGING, Orosei (Italy)
 - a. *“Study of the radiation produced by therapeutic He, C and O ion beams impinging on a PMMA target for beam range monitoring purpose in Particle Therapy”*
 - b. *“Characterisation of the secondary fast and ultrafast neutrons emitted in Particle Therapy with the MONDO experiment”*
 - c. Poster: *“Development of a dose profiler for beam range monitoring in particle therapy treatments”*
- (d) 29-30/09/2014 OncoRay Workshop “Range Assessment and Dose Verification in Particle Therapy” - Dresden (Germany)
 - a. *“Measurements of charged particles yield emitted during irradiation with therapeutic beams in view of the design of a new tool for dose monitoring in hadrontherapy”*
 - b. Poster: *“Development of an on-line dose profiler for hadron therapy treatments”*
- (e) 9-12/06/2014 SORMA: XV - Ann Arbor (U.S.A.)
 - a. *“Physical Aspect of Dose Monitoring in Hadrontherapy”*
 - b. Poster: *“Development of an on-line dose profiler for hadron therapy treatments”*
- (f) 11/03/2014 Invited Seminar at Roma Tre Open Day for high school students *“La fisica delle particelle e le applicazioni in fisica medica”*
- (g) 26-30/10/2011 SIF - L'Aquila (Italy) - *“Misura dello spettro dei fotoni prompt emessi in trattamenti carboterapici”*.

- **Attended PH.D. Schools**

- ▶ 1-5/12/2014 - 3rd FLUKA Advanced Course and Workshop - INFN - Laboratori Nazionali di Frascati (LNF, Italy)
- ▶ 7-11/10/2013 - 4th FLUKA Course - Center for Information Services and High Performance Computing of ZIH (Dresden, Germany)
- ▶ 4-8/06/2012 - III Seminario Nazionale Rivelatori Innovativi - INFN - Sezione di Firenze (Italy)

25 Febbraio 2020

Ilaria Mattei





Nata a : Delft (Paesi Bassi)

Stato civile : coniugata con tre figlie (di 11, 9 e 3 anni)

Occupazione presente: Ricercatore INFN, Sezione di Pisa (tempo indeterminato)(dal Ottobre 2017)

Posizioni pregresse

- 10/2015 -09-2017: Ricercatore (tempo indeterminato) in *ADAM* Spa, CERN-spin-off, Ginevra, Svizzera
- 05/2015 -09-2015: Ricercatore (tempo determinato) in *ADAM* Spa, CERN-spin-off, Ginevra, Svizzera
- 04/2014 - 03/2015: Assegnista ricerca Galileo Galilei in Fisica medica presso *Università di Pisa*, Italia
- 04/2013 - 03/2014: Assegnista ricerca in Fisica medica presso *INFN & Università di Pisa*, Italia
- 07/2012 - 01/2013: Post-doc "IBA"(Belgio), svolto presso *INFN* sezione di Pisa, Italia
- 06/2011 - 06/2012: Ricercatore fisica medica presso Department of Radiation Oncology, *Erasmus Medical Center*, Rotterdam, Paesi Bassi
- 04/2009 - 07/2011: Post-doc fellowship per stranieri, esperimento CMS presso *INFN* Pisa, Italia
- 12/2008 - 01/2009: Post-doc in fisica, esperimento CMS presso *Scuola Normale Superiore* Pisa, Italia
- 12/2006 - 12/2008: Individual EU Marie-Curie fellowship, esperimento CMS, presso *INFN* Pisa, Italia
- Set 2006 - Dic 2006: Contratto Affari Internazionali, esperimento CMS, presso *INFN* Pisa, Italia
- Gen 2005 - Set 2006: Postdoctoral researcher, esperimento CDF, presso *Fermilab*, Batavia, USA, con University of Pennsylvania, USA

Formazione:

- Dic 2004 **PhD in Physics** (Dottorato) **Niels Bohr Institute** (NBI), Copenhagen, Danimarca
- Ago 2001 **Master in Physics** (Laurea Magistrale) *cum laude*, **NIKHEF & Università di Amsterdam**, Paesi Bassi

Publicazioni

- 25 pubblicazioni in fisica medica (1-20 autori)
- 1 review (Frontiers in Oncology) autore singolo in fisica medica
- 447 pubblicazioni totali in HEP di cui 28, 59, 347 con le collaborazioni *ALEPH*, *CDF*, *CMS*
- 1 pubblicazione singolo autore in HEP (100+ citazioni)
- 1 review in HEP (Phys Rep) sei autori (250+ citazioni)
- 16 proceedings di conferenza

Lingue: Olandese, Inglese (eccellente), Italiano, Tedesco, Francese, Danese, Svedese (fluido) Medica.

Computing: sistemi operativi Linux/MacOS/Windows platforms, Programmazione in C/C++ /FORTRAN/Pascal
Elevata esperienza nell'uso di programmi di analisi dati (ROOT, MATHLAB)

Presentazioni a Conferenze, Seminari

- 30 presentazioni e seminari internazionali, di cui 6 su invito (pagato dagli organizzatori)
- 7 poster come primo autore in conferenze internazionali

Attività di ricerca

Fisica delle particelle

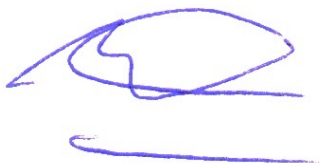
- **Fisica teorica dei neutrini (2000-2001):** Studio di vari meccanismi per la generazione di massa dei neutrini e calcolo di probabilità di decadimento lepton-flavour violating $\mu \rightarrow e \gamma$ and $\nu_1 \rightarrow \nu_2 \gamma$, ad un loop. per la tesi di laurea e Master in fisica teorica, presso NIKHEF, Amsteram (Prof. K.J.M Gaemers).
- **Ricerche di adroni pesanti in ALEPH (2001-2003):** All'inizio del mio dottorato ho lavorato alle ricerche di adroni pesanti (R-hadrons, massa > 1 GeV) previsti da scenari di nuova fisica con supersimmetria (SUSY), con i dati LEP2 dell'esperimento ALEPH. I risultati sono pubblicati in *Eur.Phys.J.C31 (2003) 327*.
- **Fenomenologia delle interazioni di adroni pesanti (2001-2005):** Una grande parte del mio lavoro di PhD è stato dedicato alla comprensione e simulazione delle loro interazioni nella materia, per cui non esistevano studi precedenti. Ho affrontato la modellizzazione degli spettri adronici insieme alle loro interazioni nucleari e elettromagnetiche nei rivelatori. Pubblicazione a singolo autore in *Eur.Phys.J. C37 (2004) 91* (100+ citazioni).
- **Ricerca di Particelle esotiche in ATLAS (2003-2005):** Sviluppo di simulazioni nel software framework dell'esperimento ATLAS (basata su GEANT) per questa tipologia di particelle esotiche. Prodotto le prime stime

di potenzialità di scoperta ad LHC. Il lavoro è stato pubblicato in *Eur.Phys.J. C49 (2007) 623* (50+ citazioni).

- **Data processing a CDF (2005-2006):** Durante il mio postdoc a Fermilab ho prestato servizio come “[data calibration coordinator](#)”, responsabile della direzione di un gruppo di persone che si occupava di calibrare i dati. Ho realizzato un sistema più efficiente di workflow con task management via software tools e book-keeping.
- **Fisica del quark top a CDF (2005-2006):** Al Fermilab ho lavorato nel gruppo di fisica del top (con E.Thomson), e sono stata responsabile di validare le simulazioni Monte Carlo (MC). Ho poi lavorato all’analisi dati per studiare la struttura di accoppiamento ($V\pm A$) del quark top. I risultati sono stati presentati a diverse conferenze e in un [seminario CERN EP](#) invitato e dedicato, e in *Phys.Rev.Lett.98 (2007)072001*.
- **Review per particelle massive stabili (2006-2007):** Contribuito a redigere grandi parti di un volume di Physics Reports “*Stable Massive Particles at Colliders*” con altri 5 co-autori. Il volume *Phys.Rept.438 (2007)*, con 250+ citazioni, rappresenta il riferimento principale per le ricerche di queste particelle
- **Tracciatore a strip di silicio CMS (2006-2007):** All’INFN di Pisa ho partecipato al commissioning del tracciatore interno a strip (TIB/TID) per l’esperimento CMS.
- **Fisica del quarkonio in CMS (2006-2011):** Le mie attività si sono svolte nella direzione della QCD a bassa energia, in particolare [fenomenologia della produzione di \$J/\psi\$ e \$Y\$](#) . Ho proposto [nuovi metodi di analisi per investigare i diversi metodi di produzione](#), [convalidato gli strumenti di simulazione Monte Carlo \(PYTHIA, Madgraph\)](#), [studiato efficienze dell’identificazione dei muoni](#), e contribuito alle prime misure di produzioni di quarkonio a LHC e relative pubblicazioni di CMS. Sono stata nominata come possibile convener del gruppo a CMS, che ho declinato.

Fisica medica

- **Sviluppo e validazione di un sistema di pianificazione per il trattamento tumori con protoni. (2011-2012)** : All’Erasmus Medical Center a Rotterdam (Paesi Bassi), ho sviluppato un [nuovo sistema di pianificazione di trattamento con ottimizzazione multi-criteria](#) per Intensity Modulated Proton Therapy (IMPT), [in collaborazione con l’Harvard Medical School \(USA\)](#). È stata pubblicazione in *Phys. Med. Biol.*
- **Studi sulle incertezze di trattamento tumori con IMPT (2011-2012).** Effettuato uno studio di trattamenti di pazienti con tumori alla testa e al collo, simulando circa 3700 trattamenti, per valutare le [conseguenze della dose dovute a incertezze](#) anatomiche in IMPT. Il lavoro è stato pubblicato in *Int.Journal of Radiation Oncology Biology Physics (the Red Journal) 87(5) (2013) 888*, considerato una referenza di primaria importanza nel campo.
- **PET come metodo di monitoraggio della dose in adroterapia (2012-2015, 2018).** Presso l’INFN di Pisa con V.Rosso ho lavorato al monitoraggio della dose con l’aiuto di un sistema dedicato PET *in-beam*. Il mio contributo è stato su 3 fronti: [Simulazione dell’attività \$\beta+\$ con il codice Monte Carlo FLUKA](#), [sviluppo di una piattaforma per l’analisi dei dati](#) di dose e attività, e [studi per la valutazione delle prestazioni in tempo reale del sistema PET](#). All lavoro è stato pubblicato in varie riviste (*JINST, Nuclear Instruments and Methods in Physics Research, RAD*)
- **Review dei metodi di verifica di range in adroterapia (2015).** Scritto una review su invito (40 pagine, singolo autore) sui principi e la modellazione dei metodi di verifica di range in adroterapia, [pubblicato in *Frontiers in Oncology 5 \(2015\)*](#). La review ha avuto un [highlight nella newsletter ESTRO](#) (Società Europea di Radioterapia e Oncologia) di luglio/agosto 2016.
- **Adroterapia protonica con acceleratori lineari (2015-2016).** In ADAM ho lavorato con M.Giunta e H. Kooy allo sviluppo di un acceleratore lineare per la terapia. Il mio compito è quello di garantire il [soddisfacimento dei requisiti normativi](#) internazionali e sui piani di trattamento. È stato pubblicato in 3 pubblicazioni di cui sono primo autore (*2 Med Phys, 1 Phys.MedL Eur. J. Med.Phys*), di cui uno come ‘[Editor’s choice](#)’ (*Med.Phys.*).
- **FOOT (2017-2020):** Nell’esperimento di FOOT, ho lavorato su simulazioni FLUKA e analisi dati test-beam del rivelatore ΔE -TOF, in preparazione dell’esperimento. Parte del lavoro è stata pubblicata in varie riviste internazionali (NIM).



Alessandra Ada Cecilia Guglielmetti- detta Alessandra Guglielmetti

CURRICULUM VITAE

INFORMAZIONI PERSONALI (NON INSERIRE INDIRIZZO PRIVATO E TELEFONO FISSO O CELLULARE)

COGNOME	GUGLIELMETTI
NOME	ALESSANDRA ADA CECILIA
DATA DI NASCITA	23, 04, 1967

Coniugata con 2 figlie nate nel 1999 e 2002

Posizione attuale:

Dal 1/10/2014 sono Professore di Seconda Fascia Confermato presso l'Università degli Studi di Milano, settore scientifico disciplinare FIS 04 (Fisica Nucleare e Subnucleare). Settore concorsuale 02-A1- Fisica sperimentale delle interazioni fondamentali

Posizioni ricoperte:

- 1/10/2011-30/9/2014 Professore di Seconda Fascia presso l'Università degli Studi di Milano, settore scientifico disciplinare FIS 04 (Fisica Nucleare e Subnucleare). Settore concorsuale 02-A1- Fisica sperimentale delle interazioni fondamentali
- 1/3/2005-30/9/2011 Ricercatore universitario confermato presso l'Università degli Studi di Milano, settore scientifico disciplinare FIS 04 (Fisica Nucleare e Subnucleare).
- 1/3/2002-28/2/2005 Ricercatore universitario presso l'Università degli Studi di Milano, settore scientifico disciplinare FIS 04 (Fisica Nucleare e Subnucleare).
- 1/3/1999-28/2/2002 Assegno di ricerca rettorale, attribuito tramite concorso, presso l'Università degli Studi di Milano
- 1/12/1997-28/2/1999 Borsa di Studio Ministeriale di Post Dottorato presso l'Università degli Studi di Milano, attribuita tramite concorso
- 1/9/1995-30/11/1997 Contratto ex-articolo 26 presso l'Università degli Studi di Milano
- 1/3/1995-31/8/1995: Post-doc presso GSI Darmstadt (Germania) nel gruppo del Prof. E. Roeckl

Titoli di Studio:

- Dottorato di Ricerca in Fisica, Università degli Studi di Milano, 1995, giudizio ottimo
- Laurea in Fisica, Università degli Studi di Milano, 23/11/1990, votazione 107/110
- Diploma di maturità scientifica, Milano, 1985, votazione 60/60

Abilitazione scientifica Nazionale Prima Fascia (Prof. ordinario):

Settore concorsuale 02-A1- Fisica sperimentale delle interazioni fondamentali

- conseguita nella tornata 2012 (scadenza 23/01/2023)
- conseguita nel quinto quadrimestre della tornata 2016 (scadenza 05/10/2027)

Attività di ricerca:

Attualmente mi occupo di astrofisica nucleare sperimentale nell'ambito della collaborazione LUNA, finanziata dalla commissione scientifica nazionale 3 dell'INFN. Tale collaborazione ha installato presso i Laboratori Nazionali del Gran Sasso (LNGS) due acceleratori di particelle con i quali è stato possibile, negli ultimi 30 anni circa, misurare le sezioni d'urto di alcune reazioni nucleari di interesse astrofisico ad energie coincidenti o molto prossime a quelle stellari. A tali energie le sezioni d'urto sono estremamente basse e la loro misura diretta è possibile solo in un laboratorio "underground", qual è LNGS, dove il fondo cosmico è notevolmente ridotto. In particolare sono state studiate reazioni chiave per il ciclo di combustione dell'Idrogeno e per la Nucleosintesi Primordiale (si veda l'articolo di rassegna su Ann Rev. Nucl and Part Sci, pubblicazione n. 6 tra quelle presentate (CIT 76; HF=7.7)). L'impatto dei risultati ottenuti è molteplice: dalla fisica dei neutrini ai modelli stellari e alla cosmologia.

A titolo di esempio si possono citare:

- La misura della reazione chiave del ciclo p-p, ${}^3\text{He}({}^3\text{He}, 2p){}^4\text{He}$, all'interno del picco di Gamow del Sole con l'esclusione della presenza di risonanze e quindi la negazione della spiegazione di origine nucleare al puzzle dei neutrini solari. Si veda pubblicazione n. 2 tra quelle presentate (CIT 179; HF=9.227)
- La misura della reazione ${}^{14}\text{N}(p, \gamma){}^{15}\text{O}$ che ha fornito una sezione d'urto inferiore a quella precedentemente nota di un fattore circa 2 con importanti conseguenze: 1) la previsione del flusso di neutrini solari prodotti nel ciclo CNO si riduce all'incirca dello stesso fattore 2) l'età dei più antichi ammassi globulari deve essere aumentata di 0.7-1 miliardi di anni rispetto alle stime correnti, modificando conseguentemente anche il limite inferiore sull'età dell'Universo. Si veda pubblicazione n. 4 tra quelle presentate (CIT=270; HF=4.162)
- La misura della reazione ${}^3\text{He}({}^4\text{He}, \gamma){}^7\text{Be}$ che ha permesso di ridurre notevolmente l'incertezza nucleare sulla previsione del flusso di neutrini solari da ${}^7\text{Be}$ e ${}^8\text{B}$. Si veda pubblicazione n. 5 tra quelle presentate (CIT 116; HF=9.227)
- La misura della reazione ${}^{17}\text{O}(p, \gamma){}^{18}\text{F}$ che ha permesso di ridurre l'incertezza sulle abbondanze di diversi isotopi di O e F nelle Novae. Si veda la pubblicazione n. 7 tra quelle presentate (CIT 44; HF=9.227)
- La misura della reazione ${}^2\text{H}(\alpha, \gamma){}^6\text{Li}$ che ha permesso di escludere spiegazioni nucleari al puzzle dell'abbondanza cosmica di ${}^6\text{Li}$. Si veda la pubblicazione n. 8 tra quelle presentate (CIT 65; HF=9.227)
- La misura della reazione ${}^{22}\text{Ne}(p, \gamma){}^{23}\text{Na}$ che ha permesso di determinare un nuovo rate di reazione con incertezze alcuni ordini di grandezza più piccole rispetto a quelle di letteratura e ricalcolare le abbondanze di ${}^{23}\text{Na}$ nelle stelle AGB. Si vedano le pubblicazioni n. 9 (CIT 33; HF=9.227) e n. 12 (CIT 8; HF=9.227) tra quelle presentate.
- La misura della reazione ${}^{17}\text{O}(p, \alpha){}^{14}\text{N}$ che ha consentito di identificare nelle stelle AGB il sito di provenienza della polvere cosmica intrappolata nelle meteoriti. Si vedano le pubblicazioni n.10 (CIT 25; HF=9.227 e n. 11 (CIT 32; HF=10.5) tra quelle presentate.

Nel 2021 verrà installata ai LNGS una nuova macchina da 3.5 MV in grado di accelerare intensi fasci di protoni, alfa e ioni carbonio per studiare reazioni chiave dei cicli di combustione dell'elio e del carbonio (Progetto LUNA MV). Tale macchina diventerà una facility permanente dei LNGS. Il contributo della collaborazione LUNA alla realizzazione di questo progetto è largamente riconosciuto dall'INFN e dalla comunità internazionale.

Nell'ambito della collaborazione LUNA ho rivestito e rivesto i seguenti ruoli:

- Principal Investigator del Progetto Premiale LUNA MV finanziato dal MIUR nel 2011 e nel 2012 per un totale di circa 5.3 milioni di euro.
- Luglio 2009-Luglio 2015: Spokesperson della collaborazione e Responsabile Nazionale per l'INFN (6 anni sono il periodo massimo consentito dalle regole interne della collaborazione). Finanziamento gestito circa 300 keuro/anno
- Da Luglio 2007: Responsabile Locale per la sede di Milano e membro del Collaboration Board. Finanziamento gestito circa 30 keuro/anno
- Luglio 2007-Giugno 2009: coordinatore dell'Editorial Board
- Settembre 2015- Luglio 2018: membro dell'Editorial Board
- Da Marzo 2018 coordinatore del gruppo di lavoro per la reazione ${}^{12}\text{C}+{}^{12}\text{C}$ a LUNA MV

Da gennaio 2017 sono stata nominata dal MIUR membro del Management Committee per l'Italia della COST action: "ChETEC: Chemical Elements as Tracer of the Evolution of the Cosmos" http://www.cost.eu/COST_Actions/ca/CA16117. Nel corso del kick-off meeting della Action svoltosi ad aprile 2017 sono stata nominata Membro del Core group (Steering committee) e coordinatore del WG1 (Nuclear data for astrophysics: needs, coordination and dissemination)

In passato ho svolto ricerche nel campo della fisica nucleare. In particolare mi sono occupata di:

- **Radioattività esotica:** fenomeno intermedio tra decadimento alfa e fissione spontanea che consiste nell'emissione spontanea di "cluster" come ${}^{14}\text{C}$, ${}^{24}\text{Ne}$, ${}^{24}\text{Mg}$ ed altri ancora da nuclei nella regione dell'Uranio-Torio, caratterizzato da vite medie parziali estremamente lunghe e forte

competizione con altre forme di decadimento adronico (alfa e fissione spontanea). Quest' attività, svolta da un numero molto ristretto di persone, è stata ampiamente riconosciuta a livello internazionale, come dimostrato dall'invito a scrivere i capitoli sulla "nuova forma di radioattività" nei volumi "Nuclear Decay Modes" ed "Heavy Elements and Related new Phenomena", un articolo divulgativo sulla rivista "Il Nuovo Saggiatore" ed un articolo su "Romanian report in Physics" oltre che dalle numerose presentazioni a congressi nazionali ed internazionali anche su invito, tra cui la Gordon Conference on Nuclear Chemistry del 1997.

- **Emissione di protoni beta ritardati e decadimento beta:** Nel periodo marzo-agosto 1995 ho lavorato come post-doc presso il GSI (Darmstadt, Germania) nel gruppo del Prof. E. Roeckl, utilizzando un separatore di massa accoppiato ad un acceleratore lineare per studiare l'emissione di protoni beta ritardati da nuclei di interesse per il processo astrofisico rp (rapid proton capture) ed il decadimento beta da nuclei nella regione dello ^{100}Sn . Nello stesso periodo sono stata "spokesperson" della proposta di esperimento per la misura dell'emissione di ^{12}C da ^{114}Ba , effettuato al GSI nel novembre 2006. Si veda la pubblicazione n.1 tra quelle presentate (CIT 51; HF=3.132)
- **Radioattività protonica:** emissione spontanea di protoni da nuclei poveri di neutroni e lontani dalla valle di stabilità. In particolare ho progettato l'apparato di rivelazione utilizzato presso il separatore di rincipi dei Laboratori Nazionali di Legnaro con il quale è stato possibile misurare per la prima volta l'emissione protonica da ^{117}La . Si veda la pubblicazione n. 3 tra quelle presentate (CIT 35; HF=3.132)
- **Produzione di fasci radioattivi e misure di reazioni nucleari ("scattering" e "break-up") alla barriera coulombiana con fasci esotici:** attività svolta nell'ambito della collaborazione EXOTIC (finanziata dalla commissione scientifica nazionale 3 dell'INFN) di cui sono stata responsabile locale per la sede di Milano dal 2003 al 2012 gestendo un finanziamento di circa 30 keuro/anno. La ricerca è stata svolta principalmente presso i Laboratori di Legnaro dove è stato installato un apparato volto alla produzione di fasci radioattivi. Il confronto tra sezioni d'urto di "scattering" elastico e "break-up" ottenute con fasci radioattivi o stabili, a parità di bersaglio, fornisce importanti informazioni sul potenziale nucleare.

Parallelamente alle attività di ricerca sopra descritte mi sono occupata anche di **fisica applicata**.

In particolare ho partecipato all'allestimento di un laboratorio per la datazione di campioni geologici ed archeologici di ossidiana con la tecnica delle tracce di fissione e ho partecipato alla messa a punto di un dosimetro basato su rivelatori a traccia per la misura di radon "indoor", utilizzato per la certificazione a norma di legge di edifici pubblici.

Sono stata responsabile del progetto PUR dell'Università di Milano per l'anno 2008 "Misura di gas radon in zone sismiche tramite spettrometria alfa" finanziato con 5 keuro.

Publicazioni:

Sono autrice o coautrice di 210 pubblicazioni:

- 106 pubblicazioni su riviste internazionali, molte delle quali ad elevato impact factor
- 94 proceedings di conferenze internazionali, la maggior parte pubblicati in seguito a valutazione anonima tra pari e su riviste con impact factor
- 2 capitoli di libri
- 8 pubblicazioni su invito

Si veda l'elenco in calce per maggiori dettagli

Co-editor di "Topical issue on underground nuclear astrophysics and solar neutrinos: Impact on astrophysics, solar and neutrino physics"

European Physical Journal - Topical Issue **52** (2016)

Impatto globale:

Fonte Web of Science- maggio 2020:

H index =34; numero citazioni totali 3838,

Fonte Scopus- maggio 2020:

H index =35; numero citazioni totali 4319

Orcid: <http://orcid.org/0000-0002-6008-1629>

Presentazioni orali a conferenze internazionali e nazionali e seminari:

28 presentazioni orali su invito a conferenze internazionali

6 presentazioni orali su invito a conferenze nazionali

7 presentazioni orali a conferenze internazionali

3 presentazioni orali a conferenze nazionali

16 seminari su invito

L'elenco delle presentazioni e dei seminari su invito è riportato in calce

Da ottobre 2009 a giugno 2015 due presentazioni annuali al Comitato Scientifico dei Laboratori Nazionali del Gran Sasso e una/due presentazioni annuali alla commissione scientifica nazionale 3 dell'INFN per l'esperimento LUNA.

Ruoli rivestiti in conferenze internazionali e workshops:

- Membro dell'International Advisory Committee (IAC) for the Nuclear Structure and Dynamics conference 2019
- Membro dell'International Advisory Committee (IAC) for the 2019 International Nuclear Physics Conference (INPC2019)
- Membro del "International Advisory Committee" per la "15th edition of the Varenna Conference on Nuclear Reaction Mechanisms" 2018
- Membro dell'International Advisory Committee (IAC) per la conferenza "15th International Symposium on Nuclei in the Cosmos" 2018
- Membro del "International Advisory Board (IAB)" per la conferenza Nuclear Physics in Astrophysics 2015
- Membro dell' "International Advisory committee (IAC)" della conferenza Origin of Matter and Evolution of Galaxies (OMEG2015)
- Membro del comitato promotore dell'"Incontro Nazionale di Fisica Nucleare", Catania 2012 Padova 2014 e Frascati 2016
- Membro del "International Program Committee (IPC)" per la conferenza Nuclear Physics in Astrophysics 2013
- Chair del Workshop: "On underground accelerator LUNA MV" 2011
- Chair del Workshop: "Starting-up the LUNA-MV collaboration" 2013
- Membro del Comitato Organizzatore del "Nuclear Astrophysics at the Canfranc Underground Laboratory- 2nd CUNA Workshop", Canfranc 2016
- Membro del comitato organizzatore del Workshop "Silver moon: the first and the next 25 years of nuclear astrophysics at Gran Sasso", LNGS 2016
- Membro del comitato organizzatore locale della conferenza "On nuclear Reaction mechanism" Varenna 2009; Varenna 2012; Varenna 2015

Attività didattica:

Ho svolto quasi tutta la mia attività didattica presso l'Università degli Studi di Milano pertanto l'Ateneo di pertinenza viene indicato esplicitamente solo per le attività svolte in altri Atenei.

1) Attività didattica nel ruolo di Professore di Seconda Fascia

Da 2011/12 a 2019/20:

Radioattività (laurea magistrale in Fisica)

Laboratorio di Ottica, Elettronica e Fisica Moderna- modulo di ottica e fisica moderna (laurea triennale in Fisica)

Da 2012/13 a 2019/2020:

Fisica Generale 1 (laurea triennale in Matematica): numero di esami registrato negli ultimi 5 anni da un minimo di 191 ad un massimo di 286.

2) Attività didattica nel ruolo di ricercatore suddivisa per corsi

2001/02: Esercitazioni per il corso di *Esperimentazioni di Fisica II* (laurea in Fisica)

Da 2003/04 a 2008/09: *Laboratorio di Fisica 3* (laurea triennale in Fisica)

Da 2002/03 a 2008/09: *Laboratorio di Fisica 4* (laurea triennale in Fisica)

2003/04 e 2004/05: Esercitazioni per il corso di *Fisica 3* (laurea triennale in Fisica)

2009/10 e 2010/11: *Laboratorio di Ottica, Elettronica e Fisica Moderna- modulo di ottica e fisica moderna* (laurea triennale in Fisica)
2007/08 e 2008/09: *Radioattività 1* (laurea magistrale in Fisica)
2009/10 e 2010/11: *Radioattività* (laurea magistrale in Fisica)
2009/10: *Laboratorio di Misure Fisiche per l'ambiente - turno di Radioattività* (laurea magistrale in Fisica)

1) Attività didattica precedente al ruolo di ricercatore suddivisa per corsi

1990/91, 1991/92 e 1992/93: Esercitazioni per il corso di *Fisica Generale* (Scienze Biologiche). Sede distaccata di Varese
1995/96, 1996/97, 1997/98 e 1998/99: Esercitazioni per il corso di *Fisica Generale* (Diploma in Tecnologie Farmaceutiche). Sede distaccata di Lodi
1996/97, 1997/98 e 1998/99: Esercitazioni per il corso di *Fisica Generale* (Diploma in Chimica Tessile). Università dell'Insubria, sede di Como
2000/01: Esercitazioni per il corso di *Esperimentazioni di Fisica II* (laurea in Fisica)

Tesi di laurea:

Relatrice di 22 tesi di laurea in fisica (1 ciclo unico, 6 magistrali, 15 triennali)
Correlatrice di 8 tesi di laurea (6 ciclo unico in fisica, 1 triennale in fisica, 1 magistrale in Scienze per la conservazione e la diagnostica dei beni culturali)
Tra gli studenti di cui sono stata relatrice/correlatrice:
Gianluca Poli riveste il ruolo di funzionario internazionale in qualità di fisico medico presso la IAEA di Vienna
Chiara Mazzocchi è assistant professor (Dr. Hab) presso l'Università di Varsavia
Carlo Bruno si è classificato secondo su 310 partecipanti al concorso per borse di dottorato di ricerca in UK finanziate dalla Scottish Universities Physics Alliance (SUPA). Attualmente è post-doc ad Edimburgo
Altri 5 studenti hanno svolto o stanno svolgendo il Dottorato di ricerca in Italia o all'estero
L'elenco delle tesi di laurea di cui sono stata relatrice è riportato in calce

Assegni di ricerca:

Docente responsabile di 2 assegni di ricerca rettorali UNIMI (Chiara Mazzocchi 3 anni e Davide Trezzi 4 anni) e di 1 assegno di ricerca INFN (Davide Trezzi, 2 anni)

Dottorato di ricerca:

- Supervisor di Eliana Masha (dottorato di ricerca in fisica astrofisica e fisica applicata - Università degli Studi di Milano ciclo XXXIV, inizio a.a. 2018/2019)
- Co-Tutor di Vera Bernardoni (dottorato di ricerca in fisica astrofisica e fisica applicata - Università degli Studi di Milano XXIII ciclo) Titolo: "Set-up of innovative experimental methodologies for the atmospheric aerosol characterisation and source apportionment".

Attività gestionale/organizzativa:

- Coordinatore per la sezione di MILANO della Commissione Scientifica Nazionale CSN3 dell'INFN da giugno 2019
- Membro della Commissione di Ateneo per le Biblioteche (Università degli Studi di Milano) dal 24/7/2018
- Presidente della Commissione scientifica del Settore Biblioteche scientifiche (Università degli Studi di Milano) dal 24/5/2018
- Direttore scientifico del consiglio della Biblioteca di Fisica (Università degli Studi di Milano) dal 1/10/2016 e membro effettivo del Consiglio della Biblioteca di Fisica dal 2004
- Membro del Consiglio dei Docenti per il Dottorato in Fisica nominato dal Rettore da ottobre 2007. Nel 2013 ho fatto parte dei 16 membri del collegio docenti del corso di dottorato in fisica, astrofisica e fisica applicata dell'Università degli studi di Milano selezionati in base a documentati risultati di ricerca in termini di "originalità e di riconoscimento internazionale dell'attività scientifica" (linee guida ANVUR e MIUR).
- Coordinatore della Sezione "Fisica del Nucleo" ed in seguito Referente del gruppo "Fisica del Nucleo" del Dipartimento di Fisica dal 2010
- Membro della commissione paritetica docenti-studenti (CPDS) per la laurea triennale e magistrale in fisica dal 2013 (anno di istituzione delle CPDS)

- Membro della commissione programmazione per posti di ricercatore a Tempo Determinato (Dipartimento di Fisica UNIMI, 2011)
- Membro del collegio di disciplina per la fascia dei Professori Associati di UNIMI per il triennio 2015-2018 e per il triennio 2018-2021
- Membro della commissione della Facoltà di Scienze Matematiche Fisiche e Naturali dell'Università degli Studi di Milano "Valutazione della didattica" (2008-2010)
- Rappresentante dei ricercatori in Giunta di Facoltà per il triennio 2008/2009-2010/2011
- Membro della commissione paritetica per la stesura del regolamento della laurea triennale in fisica, con particolare riferimento alla ristrutturazione dei corsi di laboratorio del secondo anno, a.a. 2007/08

Attività di valutazione:

- Referee di Physical Review Letters, Physical Review C, Nuclear Physics A, European Physical Journal A, Applied Radiation and Isotopes
- Membro della commissione per l'assegnazione del premio nazionale INFN "Claudio Villi- miglior tesi di Dottorato di ricerca in fisica nucleare sperimentale" per l'anno 2013
- Membro della commissione per un posto di ricercatore RTDA presso l'Università degli Studi di Napoli Federico II (2013)
- Membro della commissione d'esame finale per il XXVI ciclo di dottorato a Genova (2014)
- Membro della commissione d'esame finale per il dottorato all'Università dell'Insubria (2014)
- Membro della commissione giudicatrice per l'acquisto dell'acceleratore da 3.5MV del Progetto Premiale LUNA MV (2015)
- Membro della commissione per un posto di primo tecnologo presso i LNGS per le esigenze del Progetto LUNA MV (2015)
- Membro della commissione per un posto di collaboratore tecnico E.R. di VI livello professionale presso i LNGS (2017)
- Referee per la VQR 2011-2014
- Chair del "Felsenkeller Scientific Advisory Board" (Dresden, Germany) da gennaio 2020
- Membro della commissione per un posto RTDB 02/A1 presso l'Università di Padova (2017)
- Presidente della commissione per un posto RTDA 02/A1 presso l'Università di Milano (2019)
- Membro della commissione per un posto RTDA 02/A1 presso l'Università di Milano Bicocca (2019)
- Presidente della Commissione permanente di durata biennale per la valutazione degli assegni di ricerca scientifici e tecnologici banditi dalla sezione INFN di Milano da febbraio 2019
- Referee degli esperimenti: PANDORA (per la CSN5 dell'INFN dal 2016 al 2019 e per la CSN3 da giugno 2019) e NEWCHIM per la CSN3 dell'INFN da giugno 2019
- Membro della Commissione per la valutazione comparativa per il conferimento di attività didattiche integrative e compiti didattici extra-curricolari ai sensi dell'art. 45 del regolamento di Ateneo-Laboratorio di ottica elettronica e fisica moderna (modulo di ottica e fisica moderna) e Fisica Generale 1 presso corso di laurea triennale in matematica dall' a.a. 2016/2017 all' a.a 2019/2020

Attività di terza missione:

Partecipazione al Progetto Lauree Scientifiche del 2018 con il seminario "Studiare le stelle andando sotto terra"- svolto presso l'Università degli Studi di Milano per docenti e studenti delle scuole superiori di Milano (febbraio 2018) e presso il Liceo scientifico Grassi- Saronno- (dicembre 2018, 100 studenti coinvolti) e IIS Luigi Galvani Milano (marzo 2019, 50 studenti coinvolti).

Elenco delle pubblicazioni:

Lavori pubblicati su riviste internazionali:

106) G. F. Ciani, L. Csedreki, J. Balibrea-Correa, A. Best, M. Aliotta, F. Barile, D. Bemmerer, A. Boeltzig, C. Brogгинi, C. G. Bruno, A. Cacioli, F. Cavanna, T. Chillery, P. Colombetti,

P. Corvisiero, T. Davinson, R. Depalo, A. Di Leva, L. Di Paolo, Z. Elekes, F. Ferraro, E.M. Fiore, A. Formicola, Zs. Fülöp, G. Gervino, A. Guglielmetti, C. Gustavino, Gy. Gyürky, G. Imbriani, M. Junker, I. Kochanek, M. Lugaro, P. Marigo, E. Masha, R. Menegazzo, V. Mossa, F. R. Pantaleo, V. Paticchio, R. Perrino, D. Piatti, P. Prati, L. Schiavulli, K. Stöckel, O. Straniero, T. Szücs, M. P. Takács, F. Terrasi, D. Trezzi, S. Zavatarelli
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Eur. Phys. J A 56 (2020) 75

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2) R. Bonetti, A. Guglielmetti

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1) R. Bonetti, A. Guglielmetti

"Experiments on heavy cluster (O, F, Ne, Mg, Si) radioactivities"
in "Nuclear decay modes" edited by D. N. Poenaru
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Publicazioni su invito:

8) G. Bellini, C. Brogini, and A. Guglielmetti

Topical issue on underground nuclear astrophysics and solar neutrinos: Impact on astrophysics, solar and neutrino physics
European Physical Journal - Topical Issue **52** (2016) 88

7) A. Guglielmetti

The LUNA-MV Project at Gran Sasso Underground Laboratory
Nuclear Physics News **24:1** (2014), 40

6) L. Gialanella, A. Guglielmetti

"Direct measurement in nuclear astrophysics: ERNA and LUNA"
Scholarpedia **8(5)** (2013) 11959

5) C. Brogini, D. Bemmerer, A. Guglielmetti, R. Menegazzo

"LUNA: nuclear astrophysics deep underground"
Ann. Rev Nucl. Part Sci **60** (2010), 53

4) R. Bonetti, A. Guglielmetti

"Cluster radioactivity: an overview after 20 years"
Romanian Reports in Physics **59** (2007), 301

3) A. Guglielmetti

"Risultati recenti su misure di reazioni nucleari di interesse astrofisico"
in "Rendiconti dell'Istituto Lombardo Accademia di Scienze e Lettere"
Milano, 2005

2) R. Bonetti, A. Guglielmetti

"Esperimenti di radioattività esotica"
Il Nuovo Saggiatore, **16** (2000), 29

1) R. Bonetti, L. Bongiorno, A. Guglielmetti

"L'uso delle tracce di fossili di fissione nella datazione di ossidiane"
in "Rendiconti dell'Istituto Lombardo Accademia di Scienze e Lettere"
Milano, 1995

Presentazioni su invito a conferenze internazionali e nazionali:

- "On atomic and nuclear physics topics", Predeal 1992
- "Cluster 94", Strasburgo 1994
- "International workshop on new ideas on clustering in nuclear and atomic physics", Rauscholzhausen Castle

1997

- "Gordon Conference on nuclear chemistry", New London 1997
- "Workshop on Nuclear Reactions in stars and in the laboratory", Trento 1999
- "Exotic Nuclei at the proton drip-line", Camerino 2001
- "Exotic Clustering", Catania 2002
- "International conference Nuclear Physics in Astrophysics IV", Frascati 2009
- "GIANTS 2010", Catania 2010
- "Underground nuclear-reaction experiments for astrophysics and applications", Dresden 2010
- "From the Big bang to the nucleosynthesis", Varenna 2010
- "8th Russbach workshop on nuclear astrophysics", Russbach 2011
- "Fusion 11" St. Malo' 2011
- "VI European Summer School on Experimental Nuclear Astrophysics", Santa Tecla 2011
- "Critical stability", Erice 2011
- "Workshop on Thermonuclear Reaction Rates for Astrophysics Applications", Athens 2011
- "Nuclear Astrophysics at the Canfranc Underground Laboratory", Canfranc 2012
- "Electro-Weak Probes: from Low-Energy Nuclear Physics to Astrophysics" Trento 2012
- "7th Italy- Japan Symposium on Nuclear Physics" Milano 2012
- "2nd NEDENSAA NuPNET project meeting" Acireale 2013
- "INPC: International Nuclear Physics Conference 2013", Firenze 2013
- "TAUP: Topics in Astroparticle and Underground Physics 2013", Asilomar (CA, USA) 2013
- "Direct Measurements in Nuclear Astrophysics with Recoil Mass Separators", Caserta 2013
- "Wigner 111 - Colourful & Deep", Budapest 2013
- "GIANTS 2015", Padova 2015
- "Nuclear Structure and Dynamics", Portorose 2015
- "SIF 2015", Roma 2015
- "Lia CollAGAIN, POLITA e COPIGAL workshop", Catania 2016
- "XVII international workshop on Neutrino Telescopes", Venezia 2017
- "Ages² taking stellar ages to the next power", Isola d'Elba 2017
- "SIF 2017", Trento 2017
- "Solar neutrino conference", Dresden 2018
- "SIF 2018", Rende 2018 (relazione generale)
- "GIANTS 2019", Genova 2019

Seminari su invito:

- Università di Catania 1993: "Esperimenti di radioattività esotica: lo stato dell'arte"
- Università di Mainz 1995: "Cluster radioactivity: the experimental status of the art"
- Riunione di lavoro sull'astrofisica nucleare, Napoli 1999 "Possible use of CR39 track detectors for measuring the ${}^7\text{Be}(p, \gamma){}^8\text{B}$ reaction at LUNA"
- Istituto Lombardo-accademia di scienze e lettere, Milano 2004, "Risultati recenti su misure di reazioni nucleari di interesse astrofisico"
- "Gran Sasso day", Milano 2007, "Un laboratorio sotterraneo per studiare le stelle: esperimento LUNA"
- Oak Ridge National Laboratory 2008, "Physics colloquium", "The LUNA experiment at Gran Sasso, Italy"
- Nupecc meeting, Catania 2010, "LUNA at LNGS"
- LNGS 2010 "The ${}^2\text{H}(\alpha, \gamma){}^6\text{Li}$ reaction measurement at LUNA"
- CEN Bordeaux 2011 "Cluster radioactivity: the experimental status of the art"
- CPPM Marseille 2012 "The LUNA experiment studying stars by going underground"
- Notre Dame University 2013 "Measuring stars by going underground: the LUNA experiment at Gran Sasso Laboratory"
- Institute for nuclear and particle physics, University of Edinburgh 2014 "The LUNA experiment at Gran Sasso Laboratory: studying stars by going underground"
- Università di Bari 2014 "L'esperimento LUNA ai Laboratori del Gran Sasso: studiare le stelle da sotto una montagna"
- Warsaw University 2015 "The LUNA experiment at Gran Sasso Laboratory: studying stars by going underground"
- Physics Colloquium: Max Plank Institute Munich 2016 "The LUNA experiment at Gran Sasso Laboratory: studying stars by going underground"
- Astrofisica Nucleare (Lezione di 4 ore), XXIX edizione del Seminario Nazionale di Fisica Nucleare e

Subnucleare (Scuola di Otranto per studenti di dottorato), Otranto 2017

Tesi di Laurea (solo nel ruolo di Relatrice):

- E. Predolini (quadriennale): "Studio del decadimento esotico del nucleo ^{223}Ac ", 2004/2005
- T. Santaniello (triennale) "Misura del decadimento esotico del ^{223}Ac ", 2006/2007
- V. Capogrosso (magistrale) "Misura della sezione d'urto della reazione $^{15}\text{N}(p,\gamma)^{16}\text{O}$ ad energie di interesse astrofisico", 2008/2009
- M. Motta (triennale) "Studio di bersagli solidi di ^{18}O per la misura della reazione $^{17}\text{O}(p,\gamma)^{18}\text{F}$ nell'ambito dell'esperimento LUNA", 2009/2010
- C. Bruno (triennale) "Studio di fattibilita' della reazione $d(\alpha,\gamma)^6\text{Li}$ nell'ambito dell'esperimento LUNA", 2009/2010
- L. Di Pietro (triennale) "Datazione di campioni di ossidiana con il metodo delle tracce di fissione", 2009/2010
- D. Nicola (triennale) "Ultimi risultati sulle sezioni d'urto delle reazioni di fusione termonucleare di interesse per il sole" 2010/2011
- M. Campeggio (magistrale) "Misura delle reazioni $^{17}\text{O}(p,\gamma)^{18}\text{F}$ e $^{18}\text{O}(p,\gamma)^{19}\text{F}$ nell'ambito dell'esperimento LUNA", 2010/2011
- C. Bruno (magistrale) "Misura della reazione $^{17}\text{O}(p,\alpha)^{14}\text{N}$ nell'ambito dell'esperimento LUNA", 2011/2012
- G. Lerner (triennale) "Studio del fondo di un rivelatore al germanio per misure di sezioni d'urto di reazioni nucleari di interesse astrofisico", anno 2011/2012
- F. Tresoldi (triennale) "Misure ancillari per lo studio della reazione $^{17}\text{O}(p,\alpha)^{14}\text{N}$ a LUNA, anno 2011/2012
- E. Ragusa (triennale) "Studio della reazione $^{12}\text{C}(\alpha,\gamma)^{16}\text{O}$ ad energie di interesse astrofisico", anno 2011/2012
- A. Artesani (magistrale) "Surface dating: una nuova tecnica di datazione di manufatti in laterizi e in pietra", anno 2012/2013
- G. Porzio (triennale) "Studio dell'effetto di beam-heating per la misura della reazione di interesse astrofisico $^{22}\text{Ne}(p,\gamma)^{23}\text{Na}$, anno 2013/2014
- A. Ferrari (triennale) "Analisi dei risultati ottenuti dalla misura della sezione d'urto della reazione $^2\text{H}(p,\gamma)^3\text{He}$ effettuata a LUNA
- E. Masha (triennale indirizzo applicativo) "Sviluppo della schermatura da neutroni per l'acceleratore LUNA MV" anno 2014/2015
- Cinzia Braglia (triennale) "Studio preliminare della reazione $^2\text{H}(p,\gamma)^3\text{He}$ ad energie di interesse per la nucleosintesi primordiale a LUNA" anno 2015/2016
- Annachiara Filippini (triennale) "Analisi di bersagli di Litio per misure di sezioni d'urto di reazioni nucleari di interesse astrofisico" anno 2016/2017
- Guido Zorzi (magistrale) "Misura della reazione $^2\text{H}(p,\gamma)^3\text{He}$ a LUNA" 2016/2017
- Eliana Masha (magistrale) "Studio dell'abbondanza di deuterio primordiale" 2016/2017
- Stefano Dibartolomeo (triennale) "Studio della reazione $^2\text{H}(p,\gamma)^3\text{He}$ " 2017/2018
- Luigi Torino (triennale) "Studio di fattibilita' per la reazione $^{12}\text{C}+^{12}\text{C}$ a LUNA MV presso i laboratori LNGS", 2018/2019

Data

05/05/2020

Luogo

Milano

Europass curriculum vitae

Personal information

Surname Name

Lombardi Paolo

Address

Phone

Mobile

E-mail

Nationality

Italian

Date of birth

Sex

Male



Job Position

Primo Tecnologo II livello – Istituto Nazionale di Fisica Nucleare – from 2009

Work experience

Dates

15.05.1996 [see attachment h]

Position

I.N.F.N. fellow at L.N.G.S.

Activities and responsibilities

BOREXINO EXPERIMENT (1996 – 1997)

- I made an electronic chain for alpha / beta discrimination study ("Pulse Shape Discrimination") using the ratio method "tail / total"; Monte Carlo simulation of the whole physical process and comparison with experimental data; [ref. 2];
- I worked on a data acquisition system for 2200 Borexino photomultipliers: characterization of the "Single Photoelectron Peak", "Transit Time Jitter" and "After Pulses" [ref. 16];
- I designed and built an optical bench for attenuation and distribution of a 50 ns laser pulse (solid-state laser) [ref. 14];
- I realized a 6 coils system for earth's magnetic field compensation [ref. 1];

Name and address of the company

L.N.G.S., SS 17bis km 18,910 67010 Assergi (Aq)

Field

Scientific Research

Dates

15.11.1997 [see attachment i], [see attachment j]

Position

Fellow at "Consorzio Milano Ricerche" "Experimentation of phototube sealing techniques"

Activities and responsibilities

BOREXINO EXPERIMENT (1997 – 1999)

- I was responsible for technical and commercial research for development of a submarine coaxial connector as well as for a coaxial cable with a double water barrier: materials chemical compatibility study, aging effects ("Accelerated Ageing Test") and electrical characteristics of the entire connection ("VSWR", "Attenuation Loss", "Noise Pick-up", "Ground Loop") [ref. 3];
- I was responsible for steel capsule mechanical design for phototubes sealing [ref. 3];
- I've done test and commercial research for resins selection for phototubes potting: material compatibility in long term immersion in ultra-pure water and pseudocumene ("Accelerated Ageing Test"), study of potting "thermomechanical stress" finite element programs (ANSYS) [ref. 3];
- I was responsible for sealing techniques of Borexino and CTF phototubes [ref. 3];
- I design mechanics of pressure water tanks (2 m³ each) for pressure testing of 60 photomultipliers at a time: systematic verification of sealing reliability;

Name and address of the company

Consorzio Milano Ricerche Via Cicognara, 7 20129 Milano

Field

Scientific Research

Dates	17.05.1999 – 22.12.1999
Position	Tecnico Commerciale II livello (1999 – 2000)
Activities and responsibilities	<ul style="list-style-type: none"> - I opened and directed a subsidiary company in Milan to follow North Italian Market of Pansystem; - Design and marketing of electromechanical equipment for use in military and aerospace companies (Alenia Marconi, Agusta, Fiar defense, etc...);
Name and address of the company	Pansystem S.r.l. Via Colleverde 16, 00131 Roma
Field	Design and distribution
Dates	10.01.2000 [see attachment l], [see attachment m], [see attachment n]
Position	Tecnologo III livello I.N.F.N. sez. di Milano
Activities and responsibilities	<p>BOREXINO EXPERIMENT (2000 – up to now)</p> <ul style="list-style-type: none"> - “Detector Installation Manager” [see attachment bb] (2000 - 2005) of Borexino experiment with responsibility for the oversight and coordination of all technical installations in the detector as well as the organization of the technical staff at crucial stages of the experiment. Simultaneous installation activities on the detector with several Italian and foreign groups required from me a large commitment in technical decisions, logistics and coordination [ref. 31]; - I designed and tested a magnetic shielding for the phototube (Earth's magnetic field compensation). Identification of a ferromagnetic material ("mu-metal") with low radioactivity and selection of a paint coating as barrier against both pseudocumene and water [ref. 31]; - I have designed the mechanical mounting of phototubes on steel sphere: electrical decoupling, vacuum seal with a special low radioactivity high fluorine Viton O-ring (limited radon emanation and excellent compatibility with pseudocumene) [ref. 31]; - I have designed and tested the electrical connection system of photomultipliers: divider design and interface with electronic front-end [ref. 31]; - I designed a mechanical structure able to locate, in a prearranged and inventoried manner, the excess length of the 2200 signal cables (≈ 30 km) [ref. 31]; - Coordination of cleaning activities in class 100 clean rooms for cables, photo tubes, assembly of mechanical parts, "mu-metal" shielding and light concentrators. Drafting of procedures; - Coordination of all installation activities for 2200 signal cables. I coordinated 16 people (researchers and technicians) for a total period of six months with two daily shifts taking care of all the associated logistics for supply and transport of materials [ref. 31]; - I designed a custom Argon based mass spectrometer (Leybold quadrupole) for checking leak tightness of BOREXINO PMTs feeds-through by RGA (Residual Gas Analyser) technique. I have also coordinated all the tests on each phototube seal; - I direct measurement activities on 2,200 photomultiplier tubes ("dark room" and "Ageing Test") for devices characterization, prior to assembly in the detector. The group I coordinated was composed of 6 persons for a total period of six months [ref. 17]; - I coordinated the installation of phototubes on BOREXINO sphere using custom made circular scaffolding. The special geometry, the height of the scaffolding (13 m) and the absolute cleanliness of environment required my special attention in the coordination of 16 people in two shifts for a total period of 8 months; - I designed the “Preliminary plan for a pavement isolation system” for the Hall C of Underground Gran Sasso Laboratories on behalf of the INFN President. I also transferred the project to commissioner staff for the Gran Sasso emergency with a broad and close cooperation throughout the construction period in Hall C [ref. 15]; - “Chief Engineer” [see attachment dd] (From February 2005 up to now) and “Vice Project Manager” [see attachment cc] (October 2002/2005) on behalf of the Borexino collaboration with responsibility for the coordination of all the technical planning and works mutual integration; <ul style="list-style-type: none"> - I participated in technical coordination of all air cleaning operations to achieve stringent levels of radio-purity required by the experiment; - I assumed logistical and technical coordination of the plant (Polimeri Europa) in Sardinia for the pseudocumene supply: activities related to maintenance after 3 years of downtime and plant commissioning [ref. 37]; - I directed and coordinated operations for closing the 3 m steel sphere door. Leak tightness was assured by a 3 m diameter metal gasket (helicoflex). The sealing certified at the level of 10^{-6} mbar.L/s by an helium spectrometer;

"TERZA MISSIONE" Technology Transfer

Name and address of the company

Field

Dates

Position

Activities and responsibilities

- I made all mechanical calculations, direction and coordination for closing the huge 4 m x 4 m door of the external BOREXINO tank. The door, 7 tons weight, is equipped with a double rubber seal, double tie rods and side clips (hydrostatic pressure greater than 100 tonnes);
- I assumed technical coordination of Borexino plants maintenance, as required by regulations;
- I worked on installation activities for source insertion system (calibration 'on and off axis'), glove box, sliding seal, zero buoyancy rods, laser, etc. [ref. 44];
- I worked on calibration campaign (6 weeks) with 12 different sources and sampling of more than 100 positions within Inner Vessel volume. [ref. 44];
- **Data Analysis:** I personally worked on solar neutrinos spectrum analysis, on the global fit of the spectrum, on the study of neutrons and ^{11}C suppression, on alpha / beta analysis and statistical alpha subtraction (with Gatti filter). [ref. 22, 26, 27];
- I was responsible and author for photomultiplier sealing procedures: technology transfer to the company "Electron Tubes Limited" in London, during a total period of 5 weeks spent at company site [see attachment o], [see attachment p];

I.N.F.N. Sez. di Milano Via Celoria 16 20133 Milano

Scientific Research

10.01.2009 [see attachment ff]

Primo Tecnologo Il livello I.N.F.N. Sez. di Milano

DARKSIDE EXPERIMENT (2010 – 2015)

- "**Chief Engineer**" [see attachment gg] (from February 2011 to 2014) on behalf of DarkSide experiment, responsible for oversight and technical coordination of all mechanical design and installations in the detector [ref. 54], [ref. 55];

In details:

- I was responsible for the decommissioning and dismantling of the CTF (Counting Test Facility);
- I designed the stainless steel sphere for neutron veto;
- I designed, up to the preliminary drawings, the stainless steel cryostat for the TPC;
- I designed the anchor and levelling system of the stainless steel cryostat;
- I designed the clean room and of loading systems (crane) inside the former CTF clean room;
- I designed the integration of all installations inside the detector with 3D CAD tools;
- I was responsible for testing and for sealing of 110 high quantum efficiency Hamamatsu phototubes for the neutron veto (SBK) [ref. 74];
- I designed a mu-metal cage (grid) to mitigate the effect of Earth's magnetic field on PMT's while maximizing the light collection [ref. 74];
- I coordinated all installation activities for muon veto, neutron veto and cryostat [ref. 74];
- I was the Technical Coordinator of source insertion system for neutron veto / TPC [ref. 75];
- I was the Technical Coordinator for the insertion system of SABRE crystals inside DS-50;
- I was the Technical Coordinator of Dark Side 20T preliminary mechanical design (up to 2015) [ref. 66];

- I proposed, installed and maintained the "CTF monument" at LNGS. Design and printing of the aluminium plaque in front of the monument. The installation has a strong impact in Outreach and Dissemination for all the LNGS visitors;

"TERZA MISSIONE" Outreach and Dissemination

Activities and responsibilities

SOX EXPERIMENT (2013 – 2018)

- "**Chief Engineer**" [see attachment hh] for SOX experiment, responsible for oversight and technical coordination of all mechanical design of the experiment and all installations inside the detector [ref. 51];
- I made the mechanical design of the 3 tons tungsten container (biological shielding for neutrinos generator) [ref. 72];
- I performed the thermomechanical analysis with FEM (ANSYS) of the source/tungsten system;
- I participated in calorimeter working group (accurate measurement of the neutrinos generator) [ref. 72];
- I designed source handling systems (3 tons) both for the clean room and for the tunnel under the Borexino experiment (custom winches, rails, trolleys, etc...);

Activities and responsibilities

- I coordinated and supervised the Risk Analysis for handling of the anti-neutrinos generator;
- I coordinated and technical supervised, with the French group, the antineutrinos generator (tungsten, container source and calorimeter);
- I designed the integration of all installations and upgrades in the Borexino detector by means of 3D CAD tools;
- I coordinated the logistics and the source transportation issues with authorized companies: NUCLECO, ENEA, MIT, SRS, AREVA;
- Transportation Cask: user/coordinator certification by AREVA company (TN-MTR – 23 tons) [see attachment qq];
- I coordinated the official rehearsal test with ISPRA and AREVA supervisors: radiation controlled area coordination, handling of TN-MTR, source transportation, source insertion under Borexino (20 workers for 2 wks);
- **"SOX Project Manager"**: setting up the global SOX schedule with GANTT and PERT charts, and Work-Package;

JUNO EXPERIMENT (2013 – up to now)

- **Project Manager for Italian JUNO collaboration (2013 up to now)**
- I coordinate the R&D on new large area photomultipliers (20") either with traditional dynodes or with hybrid technologies (Multi Channel Plate):
- I upgraded the Dark Room test system in Gran Sasso with new fast digitizers and PXI bus using LabVIEW based acquisition system;
- I designed and implemented voltage dividers optimized for new Chinese MCP-PMTs;
- I measured *Single Photoelectron Peak, Transient Time Jitter e After Pulses*;
- I measured of earth magnetic field influence on new MCP-PMTs;
- **JUNO L3 Manager for Liquid Scintillator Group (2013 up to now):**
- Linear Alkyl Benzene (LAB): I selected the best producer, the best purification technique and optimal cocktails formula;
In details:
- I realized in Milan a laboratory setup to study the characteristics of new eco-friendly scintillators: mechanical setup, electronic chain, acquisition program (LabVIEW) for digitizer boards (2 GS/s on PXI bus) and data analysis by RooFit package [ref. 52];
- I measured the time response on scintillator samples by single photoelectron technique: coordination of undergraduate and graduate students;
- I evaluated the alpha-beta discrimination performance with optimal method ("Gatti filter") including response to the proton recoil induced by neutrons [ref. 52];
- I measured Absorption spectra with a dual ray UV-VIS spectrophotometer;
- I designed, constructed and operated an innovative Scintillator Attenuation Length Apparatus ("SALA") with a 430 nm laser source using a multi reflection technique in a 1.5 m long tube;
- I performed Chemical and Optical compatibility of LAB with different materials (ageing test);
- **Purification Plant Chief Engineer:**
- I designed two purification pilot plants: Vacuum Distillation and Steam Stripping (flow rates: 100 kg / h);
- RUP for two International Tenders for pilot plants construction. Tender total budget: 620.000 €;
- I made the Pilot plants installation and commissioning at Daya Bay underground laboratory in China (8 wks);
- Daya Bay detector filling with 20.000 kg of Linear Alkyl Benzene purified with Distillation and Stripping plants: I coordinated a team of 12 people for 3 month (3 purification campaigns);
- I designed the final distillation and steam stripping plants to be installed in China at JUNO site (flow rate 7000 kg / h and 1 Megawatt power) [see attached P&IDs];
- RUP for International Tender for JUNO plants construction. Tender budget: 5.200.000 €
Administrative and technical management of the tender ("Capitolato Tecnico", "Disciplinare di Gara", "Condizioni contrattuali", "Portale Simog e Anac", "Gestione ed esecuzione dei lavori");
- **JUNO Technical Board Member (2013 up to now):**
- Chairman of several internal collaboration reviews e.g.: "PMT Instrumentation", "LS filling";
- Member of several international reviews e.g.: "NNVT MCP-PMT", "Acrylic Production Readiness Review of JUNO Central Detector";

External Grants

Dates 2016 – up to now

INFN Role

Dark Side 20T Referee member for "INFN Commissione II"

Dates 2015 – 2016

INFN Role

Technical Reviewer for Km3Net project, appointed by "Presidente di Comm. II"

Dates 2010 - 2011

Role

WARP Review Committee member, appointed by "Presidente di Comm. II"

Dates 2016 – up to now

Role

Appointed to the **Editorial Board** for the scientific magazine "**Radiation Detection Technology and Methods**" [see attachment rr]

Dates 2000 – 2006 [see attachment aa]

Position

Contract Professor at Università di Fisica di Milano

"TERZA MISSIONE"

Education dissemination

Name and address of the company

- Course "*Laboratorio di fisica subnucleari*", years: 1999/2000, 2000/2001, 2001/2002, 2002/2003, 2003/2004, 2004/2005 e 2005/2006 [see attachment aa];

Field

Università degli Studi di Milano, Dipartimento di Fisica, via Celoria, 16 20133 Milano

Teaching

Education and training

Dates 1996

Academic degree

University degree in Nuclear Engineering - Full marks with Honour [see attachm. f]

Graduation thesis

"Discriminazione alfa/beta e caratteristiche di risposta dei fotomoltiplicatori dell'esperimento Borexino"

Name and address of the University

Facoltà di Ingegneria del Politecnico di Milano Piazza Leonardo da Vinci 32, 20133 Milano

Dates 1997

Academic degree

Engineering State Certification [see attachment g]

Name and address of the University

Facoltà di Ingegneria del Politecnico di Milano Piazza Leonardo da Vinci 32, 20133 Milano

Refresher courses and certifications

[see attachment k, o, q, r, s, t, u, v, w, x, y, z, ii, jj, kk, ll, mm, nn, oo, pp, qq, rr]

- "*International School of Erice*";
- Certificate for the "*Technology transfer activities carried out at the firm "ETL"*";
- "*Tecnologie del vuoto e ultravacuo*";
- "*Corso avanzato di tecnologia del vuoto*";
- "*Rischi elettrici e meccanici nell'INFN*";
- "*Operatori apparecchi di sollevamento*";
- "*Addetti ai carrelli elevatori*";
- "*Formazione alla sicurezza per gruisti*";
- "*Preposto con funzione di sorvegliante dei lavoratori addetti ai sistemi di accesso e posizionamento mediante funi*";
- "*Lavoratori addetti ai sistemi di accesso e posizionamento mediante funi*";
- "*Corso base di HTML*";
- "*Corso ANSYS termica avanzato*";
- "*Addetto utilizzo apparecchi di sollevamento*";
- "*Gestione dell'emergenza e lotta antincendio nei luoghi di lavoro*";
- "*Aggiornamento Lavoratori addetti ai sistemi di accesso e posizionamento mediante funi*";

Conferences talks, proceedings and posters

- "Aggiornamento Preposto con funzione di sorvegliante dei lavoratori addetti ai sistemi di accesso e posizionamento mediante funi";
- "English: Upper way stage 2", Wall Street Institute;
- "NX Modelling / Assembly / Sheet Metal e Drafting";
- "Corso di Radioprotezione";
- "Orbital Welding specialized operator";
- AREVA International Training certificate on Nuclear Transportation Cask TN-MTR
- Appointed to the Editorial Board of "Radiation Detection Technology and Methods"
- TAUP 1997, 7-11 September 1997, Laboratori Nazionali del Gran Sasso (Italy)
- 10th ICATPP Conference on Astroparticle, Particle, Space Physics, Detectors and Medical Physics Applications, Villa Olmo, Como 5-9 October 1998
- 9th Vienna Conference on Instrumentation Vienna / Austria, February 19 - 23, 2001
- NDM03 - Neutrinos and Dark Matter in Nuclear Physics, June 9-14, 2003, Nara Japan
- Future low energy neutrino experiments, 23-25 Feb 2005 Angra dos Reis, Brazil
- 10th ICATPP Conference on Astroparticle, Particle, Space Physics, Detectors and Medical Physics Applications, Villa Olmo, Como 8-12 October 2007
- Neutrino 2008 - The XXIII Conference on Neutrino Physics and Astrophysics, 25 - 31 May 2008 Christchurch - New Zealand
- 13th ICATPP Conference on Astroparticle, Particle, Space Physics and Detectors for Physics Applications, Villa Olmo, Como 3-7 October 2011
- International Symposium on Neutrino Physics and Beyond, 23-26 Sep 2012, Shenzhen China
- China-Italy Science, Technology and Innovation Week, 16-20 Nov 2015 Beijing, China

Personal skills

English

UNDERSTANDING				
LISTENING		SPEAKING		WRITING
C1	C1	B2	B2	B1

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user

Communication skills

- Group interactions: I worked in research groups as coordinator and I participated in manufacturing groups in a business company;
- Intercultural interactions: my experience at INFN led me to interact with international collaborations in Italian and foreign laboratories;

Organisational / managerial skills

- Day by day planning, schedule and personnel management [see attachments bb, cc, dd, gg, hh] during various management positions: "Detector Installation Manager", "Chief Engineer and Chairman Technical Board" and "Vice Project Manager" for Borexino, "Chief Engineer" for DarkSide, "Chief Engineer" and "Project Manager" for SOX, "Italian Project Manager", "Purification Plant Chief Engineer" and "Technical Board Member" for JUNO;
- During my work at private company, I opened and directed a new subsidiary company in Milan taking care of commercial management and technical area coordination;
- In Milan I realized and I am still directing a laboratory for scintillators and photomultipliers characterization with the coordination of undergraduate and graduate students [ref. 52];

Technical skills

- Electronic instruments: acquisition systems based on NIM, CAMAC, VME and PXI architecture with various types of sensors (photomultipliers, silicon and germanium detectors, etc.);
- Vacuum technology: design and construction of high vacuum systems (two training INFN courses) [see attachment q, r];
- Mass spectroscopy: design and construction of a system for leak checking by means of a mass spectrometer and a residual gas tracer [ref. 59];
- CAD: 2D AutoCAD and 3D NX-11 design skill [see attachment nn];
- Plants: purification systems for gases and liquid with high degree of cleanliness and radio purity;
- Cryogenic systems [ref. 54, 55];

Computer skills

- Operating systems: good knowledge of WINDOWS and Office;
- Programming languages: C++, HTML, LABVIEW e ROOT;
- Programs: AutoCAD, NX-11, ANSYS, Matlab, Microsoft Project, etc... [see attachment nn];

1. *"The Earth's magnetic field compensation in the Borexino phototubes facility"*, P. Lombardi and PMT working group, INFN/TC-97/35 SIS - Pubblicazioni Frascati;
2. *"Pulse shape discrimination of liquid scintillators"*, A. Goretti, P. Lombardi, G. Ranucci, N.I.M. A 412 (1998) 374-386;
3. *"Status report of the PMT working group"*, P. Lombardi and PMT working group;
4. *"A Large Scale Low Background Liquid Scintillator Detector: the Counting Test Facility at Gran Sasso"*, Borexino collaboration, N.I.M. A 406 (1998) 411-426;
5. *"Measurements of ^{14}C abundance in a low-background liquid scintillator"*, Borexino collaboration, Physics Letters B. 422 (1998) 349-358
6. *"Ultra-low Background measurements in a large volume underground detector"*, Borexino collaboration, Astroparticle Physics 8 (1998) 141-157;
7. *"Light propagation in a large volume liquid scintillator"*, Borexino collaboration, N.I.M. A 440 (2000) 360-371;
8. *"Science and Technology of Borexino: a real time Detector for Low Energy Solar Neutrinos"*, Borexino collaboration, Astroparticle Physics 16 (2002) 205-234;
9. *"Measurements of extremely low radioactivity levels in BOREXINO"*, Borexino collaboration, Astroparticle Physics 18 (2002) 1-25;
10. *"Search for electron decay mode $e \rightarrow \gamma + \nu$ with the prototype of Borexino detector"*, Borexino collaboration, Physics Letter B 525 (2002) 29-40;
11. *"New limits on nucleon decays into invisible channels with the BOREXINO counting test facility"*, Borexino collaboration, Physics Letter B 563 (2003) 23-34;
12. *"Study of neutrino electromagnetic properties with the prototype of the Borexino detector"*, Borexino collaboration, Physics Letter B 563 (2003) 35-47;
13. *"New experimental limits on heavy neutrino mixing in ^8B -decay obtained with the Borexino Counting Test Facility"*, Borexino collaboration, Pis'ma v ZhETF, vol. 78, iss. 5 (2003) pp. 707-712;
14. *"A multiplexed optical-fiber system for the PMT calibration of the Borexino experiment"*, Caccianiga, D. Franco, D. Giugni, P. Lombardi, S. Malvezzi, J. Maniera, G. Manusardi, L. Miramonti, G. Ranucci, O. Smirnov, N.I.M. A 496 (2003) 353-361;
15. *"Progetto preliminare sistema di isolamento pavimentale della sala C – area Borexino"*, P. Lombardi, A. Salvatori, Progetto per la presidenza INFN;
16. *"Precision measurements of timing characteristics of ETL9351 photomultipliers"*, O.Ju. Smirnov, P. Lombardi, G. Ranucci, Instruments and Experimental Techniques, vol. 47 No. 1 (2004), pp 69-79;
17. *"The photomultiplier tube testing facility for the Borexino experiment at LNGS"*, A. Brigatti, A. Ianni, P. Lombardi, G. Ranucci, O.Ju. Smirnov, N.I.M. A 537 (2005) 521-536;
18. *"A sampling board optimized for pulse shape discrimination in liquid scintillator applications"*, G. Ranucci, R. Dossi, P. Inzani, G. Korga, P. Lombardi, E. Meroni, M.E. Monzani, IEEE Transactions on Nuclear Science, vol. 51, No. 4, August 2004;
19. *"New experimental limits on violation of the Pauli exclusion principle obtained with the Borexino Counting Test Facility"*, Borexino collaboration, The European Physical Journal C 37 (2004) 421-431;
20. *"The measurements of 2200 ETL9351 type photomultipliers for the Borexino experiment with the photomultiplier testing facility at LNGS"*, A. Ianni, P. Lombardi, G. Ranucci, O.Ju. Smirnov, N.I.M. A 537 (2005) 683-697;
21. *"Search for electron antineutrino interactions with the Borexino Counting Test Facility at Gran Sasso"*, Borexino collaboration, The European Physical Journal C 47 (2006) 21-30;
22. *"CNO and pep neutrino spectroscopy in Borexino: measurement of the deep underground production of cosmogenic ^{11}C in an organic liquid scintillator"*, Borexino collaboration, Physical Review C 74, 045805 (2006);
23. *"Time and position distributions in large volume spherical scintillation detectors"*, P. Lombardi, G. Ranucci, N.I.M. A 574 (2007) 65-82;
24. *"The Borexino detector: construction and performances"*, P. Lombardi, Astroparticle, Particle and Space Physics..., Proc. Of 10th Conference Villa Olmo (2008) 214-223;
25. *"The Borexino detector: photomultipliers system"*, P. Lombardi, Journal of Physics: Conference Series 136 (2008) 042011;
26. *"First real time detection of ^7Be solar neutrinos by Borexino"*, Borexino Collaboration, Physics Letters B 658 (2008) 101-108;
27. *"Direct measurement of the ^7Be solar neutrino flux with 192 days of Borexino Data"*, Borexino Collaboration, Physical Review Letters 101, 091302 (2008);
28. *"Search for solar axions emitted in the M1-transition of $^7\text{Li}^*$ with Borexino"*, Borexino Collaboration, The European Physical Journal C 54 (2008) 61-72;
29. *"Pulse-shape discrimination with the Counting Test Facility"*, Borexino Coll., N.I.M. A 584 (2008) 98-113;
30. *"Study of phenylxylethane (PXE) as scintillator for low energy neutrino experiments"*, Borexino Collaboration, N.I.M. A 585 (2008) 48-60;
31. *"The Borexino detector at the Laboratori Nazionali del Gran Sasso"*, Borexino Collaboration, N.I.M. A 600 (2009) 568-593;
32. *"The liquid handling systems for the Borexino solar neutrino detector"*, Borexino Collaboration, N.I.M. A 609 (2009) 58-78;
33. *"Measurement of the solar ^8B neutrino rate with a liquid scintillator target and 3 MeV energy threshold in the Borexino detector"*, Borexino Collaboration, Physical Review D 82 (2010) 033006;

34. "Observation of geo-neutrinos", Borexino Collaboration, *Physics Letters B* 687 (2010) 299-304;
35. "New experimental limits on the Pauli-forbidden transitions in ^{12}C nuclei obtained with 485 days Borexino data", Borexino Collaboration, *Physical Review C* 81 (2010) 034317;
36. "Precision Measurement of the ^7Be Solar Neutrino Interaction Rate in Borexino", Borexino Collaboration, *Physical Review Letters* 107 (2011) 141302;
37. "The scintillator solvent procurement for the Borexino solar neutrino detector", M.G. Giammarchi, P.L. Lombardi, L. Miramonti, F. Ortica, S. Parmeggiano, A. Romani, C. Salvo, P. Tronci, N.I.M. A 648 (2011) 100-108;
38. "Muon and cosmogenic neutron detection in Borexino", Borexino Collaboration, *Journal of instrumentation* 6 (2011) P05005;
39. "Search for modulations of the solar $\text{Be}7$ flux in the next-generation neutrino observatory LENA", M. Wurm et al., *Physical Review D* 83 (2011) 032010;
40. "Solar neutrino results from Borexino and main future perspectives", M. Pallavicini et al., N.I.M. A 630 (2011) 210-213;
41. "Study of solar and other unknown anti-neutrino fluxes with Borexino at LNGS", Borexino Collaboration, *Physics Letters B* 696 (2010) 191-196;
42. "High precision ^7Be solar neutrinos measurement and day night effect obtained with Borexino", Borexino Collaboration, N.I.M. A 692 (2012) 258-261;
43. "Measurement of CNGS muon neutrino speed with Borexino", Borexino Collaboration, *Physics Letters B* 716 (2012) 401-405;
44. "Borexino calibrations: hardware, methods, and results", Borexino Collaboration, *Journal of instrumentation* 7 (2012) P10018;
45. "Search for solar axions produced in the $p(d,3\text{He})\text{A}$ reaction with Borexino detector", Borexino Collaboration, *Physical Review D* 85 (2012) 092003;
46. "Cosmic-muon flux and annual modulation in Borexino at 3800 m water-equivalent depth", Borexino Collaboration, *Journal of Cosmology and Astroparticle Physics* 5 (2012) 15;
47. "First Evidence of pep Solar Neutrinos by Direct Detection in Borexino", Borexino Collaboration, *Physical Review Letters* 108 (2012) 051302;
48. "Absence of a day-night asymmetry in the ^7Be solar neutrino rate in Borexino", Borexino Collaboration, *Physics Letters B* 707 (2012) 22-26;
49. "The next-generation liquid-scintillator neutrino observatory LENA", LENA collaboration, *Astroparticle Physics* 35 (2012) 685-732;
50. "Cosmogenic Backgrounds in Borexino at 3800 m water-equivalent depth", Borexino Collaboration, *Journal of Cosmology and Astroparticle Physics* 8 (2013) 49;
51. "SOX: Short distance neutrino Oscillation with Borexino", Borexino Collaboration, *Journal of High Energy Physics* 8 (2013) 38;
52. "Decay time and pulse shape discrimination of liquid scintillators based on novel solvents", P. Lombardi, F. Ortica, G. Ranucci, A. Romani, N.I.M. A 701 (2013) 133-144;
53. "Lifetime measurements of ^{214}Po and ^{212}Po with the CTF liquid scintillator detector at LNGS", Borexino Collaboration, *The European Physical Journal A* (2013) 49-92;
54. "DarkSide search for dark matter", DarkSide Collaboration, *Journal of instrumentation* 8 (2013) C11021;
55. "Light yield in DarkSide-10: A prototype two-phase argon TPC for dark matter searches", DarkSide collaboration, *Astroparticle Physics* 49 (2013) 44-51;
56. "New limits on heavy sterile neutrino mixing in 8B decay obtained with the Borexino detector", Borexino Collaboration, *Physical Review D* 88 (2013) 072010;
57. "Measurement of geo-neutrinos from 1353 days of Borexino", Borexino Collaboration, *Physics Letters B* 722 (2013) 295-300;
58. "Borexino: Low background techniques adopted during the installation", P. Lombardi, A. Goretti, *Internal Journal of Modern Physics A* 29 (2014) 1442006;
59. "The optical system in Borexino", P. Lombardi, *Internal Journal of Modern Physics A* 29 (2014) 1442003;
60. "Final results of Borexino Phase-I on low-energy solar neutrino spectroscopy", Borexino Collaboration, *Physical Review D* 89 (2014) 112007;
61. "Neutrinos from the primary proton-proton fusion process in the Sun", Borexino Collaboration, *Nature* 512 (2014) 383;
62. "Spectroscopy of Geoneutrinos from 2056 days of Borexino data" *Physical Review D* 92, 031101(R) (2015);
63. "First results from the DarkSide-50 dark matter experiment at Laboratori Nazionali del Gran Sasso", *Phys. Lett. B* (2015) Volume 743, 456-466;
64. "The DarkSide Multiton Detector for the Direct Dark Matter Search", *Adv. High Energy Phys.* (2015);
65. "Test of Electric Charge Conservation with Borexino", *PHYS REV LETT* (2015) Volume 115 Issue 23
66. "The electronics and data acquisition system for the DarkSide-50 veto detectors", *J INSTRUM* (2016) Volume 11
67. "Results from the first use of low radioactivity argon in a dark matter search", *PHYS REV D* (2016) Volume 93 Issue 8
68. "Neutrino physics with JUNO", *J PHYS G NUCL PARTIC* (2016) Volume 43 Issue 3
69. "The veto system of the DarkSide-50 experiment", *J INSTRUM* (2016) Volume 11
70. "CALIS - A CALibration Insertion System for the DarkSide-50 dark matter search experiment", *J INSTRUM* (2017) Volume 12
71. "Limiting neutrino magnetic moments with Borexino Phase-II solar neutrino data", *PHYS REV D* (2017) Volume 96 Issue 9

72. "Seasonal modulation of the Be-7 solar neutrino rate in Borexino", *ASTROPART PHYS* (2017) Volume 92
73. "A Search for Low-energy Neutrinos Correlated with Gravitational Wave Events GW 150914, GW 151226, and GW 170104 with the Borexino Detector", *The Astrophysical Journal (ApJ)*, 850-21, Nov. 2017
74. "Borexino's search for low-energy neutrino and antineutrino signals correlated with gamma-ray bursts", *ASTROPART PHYS* (2017) Volume 86
75. "The Monte Carlo simulation of the Borexino detector", *ASTROPART PHYS* (2018) Volume 97

Privacy

I authorize the use of my personal data, according to Italian laws 675/96 and Decreto Legislativo 30 giugno 2003, n. 196 "Codice in materia di protezione dei dati personali".

Date

03-05-2018

In witness thereof,



Curriculum del Dott. Tommaso Lari

Titoli accademici, contratti e attività professionale

- Laurea in Fisica presso l'Università di Bologna il 12/06/1998 con la votazione di 110/110 e lode.
- Borsa di studio dell'INFN presso i Laboratori Nazionali del Gran Sasso, (Aprile 1998 - Marzo 1999).
- Dottorato di Ricerca presso l'Università di Milano (Marzo 1999 - Dicembre 2001) e conseguimento del titolo di Dottore di Ricerca in Fisica.
- Borsa di studio post-dottorato presso l'Università di Bonn (Germania) (Gennaio-Agosto 2002)
- Assegno di Ricerca dell'INFN presso la sezione di Milano (Marzo 2002 - Dicembre 2005).
- Ricercatore di III livello dell'INFN presso la sezione di Milano (tempo determinato : Dicembre 2005 - Maggio 2009; a tempo indeterminato dal Maggio 2009)
- Borsa di simiffellow per svolgere attività di ricerca al CERN : Settembre 2008 - Agosto 2009 e Gennaio-Dicembre 2013)

Partecipazione a progetti di ricerca internazionali

- ATLAS, esperimento del CERN per lo studio della rottura della simmetria elettrodebole e della fisica alla scala del TeV, dal 1999 alla data presente.
- MACRO, rivelatore per lo studio della radiazione cosmica e ricerca di monopoli magnetici ai LNGS, dal 1997 al 1999
- RD50, progetto del CERN per lo sviluppo di rivelatori resistenti alla radiazione, dal 2002 al 2004

Ruoli e responsabilità di coordinamento

A meno che non sia diversamente specificato, tutti i ruoli riportati sono stati svolti insieme ad un collega, secondo lo standard diffuso nell'esperimento ATLAS di avere due coordinatori per ogni gruppo di lavoro.

- Convener del gruppo di **Supersimmetria** di ATLAS (Ottobre 2014 - Settembre 2016). Ruolo : coordinamento del lavoro di circa 300 ricercatori e studenti per analisi di ricerca di segnali supersimmetrici.
- Convener del gruppo di **Supersimmetria background forum** di ATLAS (Ottobre 2009 - Settembre 2010). Sottogruppo di Supersimmetria. Responsabilità : messa a punto e scrutinio delle procedure di stima dei fondi e della produzione MonteCarlo per le analisi del gruppo di Supersimmetria.
- Convener del gruppo di **Supersimmetria third generation squarks** di ATLAS (2011 - 2013). Sottogruppo di Supersimmetria, circa 60 ricercatori e studenti attivi.
- Convener del gruppo di **Supersimmetria electroweak production** di ATLAS (Aprile 2017 - Marzo 2018). Sottogruppo di Supersimmetria, circa 60 ricercatori e studenti attivi.
- Convener del gruppo di **Fast Chain** di ATLAS (Dicembre 2016 - presente). Responsabilità : sviluppo del futuro programma di simulazione dell'esperimento, con l'obiettivo di ridurre il consumo di CPU per evento di circa un fattore cento.
- Coordinamento delle **analisi di ATLAS Italia** (Ottobre 2016 - Settembre 2018, il primo anno come deputy ed il secondo come coordinatore principale). Fino a Settembre 2017, il ruolo prevedeva anche il coordinamento delle **iniziative di terza missione di ATLAS Italia**.

Incarichi istituzionali

- Da Gennaio 2017 sono membro della commissione assegni di ricerca della Sezione INFN di Milano.
- A partire dall'anno accademico 2014-2015 alla data presente, sono membro del Collegio dei Docenti del corso di Dottorato in Fisica dell'Università di Milano.

Organizzazione di conferenze

Conferenze e congressi internazionali :

- Convener del gruppo *New Physics of Electroweak Symmetry Breaking* del workshop *Physics at TeV Colliders* (Les Houches, 2005) ^{1 2}.
- Convener del gruppo di lavoro *Flavour Physics at high Q* del workshop *Flavour physics in the era of the LHC* (CERN, 2005-2007) ^{3 4}.
- Convener delle sessioni "SUSY" di *LHCP 2015* (Saint Petersburg, 2015)⁵.
- Convener delle sessioni "Search for supersymmetry" di *LHCP 2016* (Lund, 2016)⁶.
- Convener delle sessioni "Searches" di *LHCP 2017* (Shanghai, 2017)⁷.

Conferenze e congressi nazionali :

- Chair della sessione parallela di *Nuova Fisica* agli *Incontri di Fisica delle Alte Energie* (Napoli, 2007) ⁸.
- Convener della sessione *SUSY+Exotica* agli *Incontri di Fisica delle Alte Energie* (Cagliari, 2013) ⁹.

¹Web page : <https://phystev.cnrs.fr/Houches2005/>

²Proceedings : <https://arxiv.org/pdf/hep-ph/0602198.pdf>

³Web page : <http://mlm.home.cern.ch/mlm/FlavLHC.html>

⁴Proceedings : T. Lari et al., Eur. Phys. J. C57, 183, DOI <https://doi-org.ezproxy.cern.ch/10.1140/epjc/s10052-008-0713-4>

⁵Web page : <https://indico.cern.ch/event/389531/sessions/78346/>

⁶Web page : <https://indico.cern.ch/event/442390/page/5281-scientific-programme-overview>

⁷Web page : <https://indico.cern.ch/event/517784/sessions/223842/>

⁸Web page : <https://indico.cern.ch/event/14815/>

⁹Web page : <https://agenda.infn.it/conferenceTimeTable.py?confId=5829>

- Come vicecoordinatore (2016-2017) e coordinatore (2017-2018) delle analisi di ATLAS Italia, ho selezionato le presentazioni e i poster sottomessi da ATLAS a IFAE 2017 e IFAE 2018, e ai congressi della Società Italiana di Fisica del 2017 e 2018. Ho poi revisionato i contributi accettati e (nel caso di IFAE) i proceedings.

Congressi della collaborazione ATLAS : si tratta di congressi legati a gruppi di lavoro che coordinavo in quel momento, Sono stato coinvolto nella scelta della sede, nella definizione del formato, del programma, e dei relatori, e nel caso del congresso a Milano ho gestito tutti i dettagli dell'organizzazione locale.

- *Third generation squark searches* tenutosi a Milano nel giugno 2014 cui hanno partecipato 42 persone.
- *SUSY* tenutosi a Sussex nell'aprile 2016, cui hanno partecipato 137 persone
- *SUSY and Exotics* tenutosi a Bucharest in maggio 2017, cui hanno partecipato 261 persone.
- Congresso sulle attività di *fisica e upgrade di ATLAS Italia* tenutosi a Napoli nel novembre 2016 cui hanno partecipato 110 persone.
- Congresso sulle attività di *fisica e upgrade di ATLAS Italia* tenutosi a Pavia nell'ottobre 2017, cui hanno partecipato 85 persone.

Relazioni a conferenze

Conferenze internazionali :

- **C1** Measurements of spatial resolution of ATLAS pixel detectors, *Pixel 2000*, Genova 2000.
- **C2** Test Beam results of ATLAS Pixel sensors, *Pixel 2002*, Carmel (CA), 2002.
- **C3** Measurement of trapping time constants in irradiated DOFZ silicon with test beam data, *Frontier Detectors for Frontier Physics*, La Biodola 2003.
- **C4** Radiation hardness studies of silicon pixel detectors, *Vertex 2004*, Menaggio (Lago di Como) 2004.
- **C5** Simulation of Signals in Ultra-Radiation hard silicon pixel detectors, *IEEE Nuclear Physics Symposium*, Roma 2004.

- **C6** SUSY studies with ATLAS: hadronic signatures and Focus Point, *Physics at LHC*, Vienna 2004.
- **C7** Search for Supersymmetry with early ATLAS data, *Frontier Science 2005*, Milano 2005.
- **C8** Supersymmetry measurements with ATLAS, *LHC-DM09*, Ann Arbor 2009.
- **C9** Recent results from new physics searches at ATLAS, *Physics at LHC*, Perugia 2011.
- **C10** Searches for direct pair production of third generation squarks with the ATLAS detector, *EPS-HEP*, Stokholm 2013.
- **C11** ATLAS results on SUSY searches, *SUSY 2015*, Lake Tahoe 2015.
- **C12** Searches for direct pair production of third generation squarks in final states with no leptons with the ATLAS detector, *EPS-HEP*, Venezia 2017.
- **C13** Beyond Standard Model searches at LHC, *Relazione su invito a Pushing the boundaries of the energy and intensity frontiers*, Durham 2018.

Conferenze e workshop nazionali :

- **C14** Searches for New Physics at the LHC, *Incontri di Fisica delle Alte Energie*, Torino 2004.
- **C15** Reconstruction of sparticles masses at the LHC, *Incontri di Fisica delle Alte Energie*, Catania 2005.
- **C16** Search for Supersymmetry with early ATLAS data, *Incontri di Fisica delle Alte Energie*, Pavia 2006.
- **C17** Rassegna e stato del rivelatore a pixel di ATLAS, *Congresso Nazionale SIF*, Pisa 2007.
- **C18** Supersymmetry searches with the ATLAS detector, *Galileo Galilei Institute workshop*, Firenze 2011.
- **C19** Can the world be supersymmetric ? The scenario after the first LHC run, *Congresso Nazionale SIF*, Pisa 2014. **(su invito)**

Ruoli di docenza in scuole internazionali

- Ho tenuto il corso sulla Supersimmetria all'*Hadron Collider School* tenutasi a Gottinga nel luglio 2013¹⁰.
- Ho tenuto il corso sulla Supersimmetria all'*Hadron Collider School* tenutasi a Gottinga nel luglio 2014¹¹.

Terza missione

- **Responsabile delle attività di outreach di ATLAS Italia** da Ottobre 2016 a Settembre 2017. Attività principali : mantenimento pagina Facebook e sito di Atlas Italia, preparazione e revisione di articoli su novità e iniziative di interesse per il pubblico. Da Ottobre 2017, ho continuato ad essere membro del gruppo di outreach di ATLAS Italia.
- Guida in diverse visite al CERN organizzate per studenti del dipartimento di Fisica di Milano
- Videoconferenza dal CERN con il pubblico di Zrenjanin (Serbia) nel contesto della Notte Europea dei Ricercatori del 2012
- Guida della mostra “extreme” al Museo della Scienza di Milano durante la Notte Europea dei Ricercatori del 2017
- Responsabile delle attività di outreach di ATLAS Italia da Ottobre 2016 a Settembre 2017. Attività principali : mantenimento pagina Facebook e sito di Atlas Italia, preparazione e revisione di articoli su novità e iniziative di interesse per il pubblico.
- Pubblicazione di articoli sul CERN Courier [PR38] e sulla pagina per il pubblico di ATLAS

Attività di ricerca scientifica

Dal 1999 la mia attività di ricerca si è svolta principalmente nell'ambito di ATLAS, un esperimento del CERN per lo studio della rottura della simmetria elettrodebole e la ricerca di nuovi fenomeni a quella scala di energia. La mia attività include due linee principali. La prima è la caratterizzazione dei rivelatori a pixel dell'esperimento, con particolare attenzione agli effetti di danneggiamento da radiazione. La seconda è l'analisi dati, in particolare la ricerca di particelle supersimmetriche. Nel seguito descrivo in dettaglio il mio contributo a ciascuna di queste linee di ricerca.

Chiave per le referenze fornite nella descrizione dell'attività di ricerca : [12] articolo su rivista o libro, elenco in calce al CV; [PR1] lavoro non pubblicato su rivista o

¹⁰<https://indico.cern.ch/event/232639/timetable/>

¹¹<https://indico.cern.ch/event/292887/timetable/>

libro, elenco in calce al CV; [C2] presentazione a conferenze, elenco sopra; [T3] tesi di cui sono stato supervisore, elenco in calce al CV

Esperimento ATLAS, analisi dati

Ricerche di Supersimmetria prima della presa dati (2003-2009).

Prima che fossero disponibili i dati raccolti ad LHC ho lavorato allo sviluppo di strategie di analisi. Mi sono occupato in particolare dello studio della regione di “Focus Point” dei modelli mSUGRA, caratterizzata da un segnale costituito dalla produzione di gluini che decadono mediante quark di terza generazione in neutralini e chargini. Oggi questo è una tipologia di segnale tra le più cercate nelle analisi dei dati di LHC, ma nel 2003 sono stato tra i primi a studiarla. Ho mostrato i miei studi alla conferenza *Physics at LHC* nel 2004 [C6] ed agli *Incontri di Fisica delle Alte Energie* nel 2005 [C15]. I risultati di questo studio sono poi diventati oggetto di una pubblicazione [6]. Un altro articolo [8] tratta della complementarità tra le misure effettuabili ad LHC e quelle basate sull’osservazione di raggi γ provenienti dall’annichilazione di neutralini al centro della Galassia. Ho anche studiato per la prima volta la possibilità di rivelare di coppie di top scalari relativamente leggeri (100-150 GeV/ c^2) ad LHC, definendo punti di benchmark nello spazio dei parametri in collaborazione con teorici, e sviluppando una tecnica basata sui dati per la stima del difficile fondo di top. Questo studio e’ documentato in una nota interna di ATLAS [PR8] e nei proceedings del workshop di Les Houches 2005 [PR36]. Ho inoltre presentato a nome della collaborazione rassegne riguardanti la preparazione delle analisi di supersimmetria di ATLAS in diverse conferenze internazionali [C7, C8] e nazionali [C16].

Misure di fisica del quark top (2010-2011). Con l’entrata in funzionamento di LHC alla fine del 2009, mi sono occupato dello studio della produzione di coppie di quark top, un processo di grande interesse in sè ma anche uno dei fondi principali alle ricerche di supersimmetria che avevo intenzione di effettuare successivamente. Ho contribuito alla stima del fondo dovuto alla produzione di bosoni W in associazione a getti, nell’ambito della prima misura di sezione durto di coppie di quark top con ATLAS [PR10, PR14, PR16, PR18, 36]. Ho poi contribuito alla prima misura di asimmetria di carica in eventi con coppie di top [PR20, 153].

Ricerche di supersimmetria (2009-2018). All’inizio della presa dati ero coordinatore del gruppo di lavoro sulla stima dei fondi ad analisi di ricerca di particelle supersimmetriche. Ho svolto questo incarico tra ottobre 2009 ed il settembre 2010, un periodo durante il quale si sono sviluppate quelle tecniche di stima dei fondi che sono state usate nelle prime pubblicazioni del gruppo SUSY di ATLAS [45, 47, 53]. Molti dei concetti fondamentali sviluppati in quel periodo, quali le regioni di controllo e validazione per la normalizzazione dei

processi di fondo e la verifica della bontà delle stime, sono poi diventati parte integrante delle ricerche di supersimmetria di ATLAS fino alla data presente.

Nel frattempo lavoravo allo sviluppo di un'analisi per la ricerca di squark e gluini, e successivamente di top squark, in eventi con due elettroni o muoni. Ho anche coordinato il gruppo di persone che si occupava di questo canale, e che ha incluso negli anni colleghi di cinque istituti italiani e tre stranieri, tra il 2009 ed il 2014. Questa attività ha portato alla pubblicazione di cinque articoli [55, 56, 109, 215, 310]. Dopo il completamento delle analisi sui dati del primo run di LHC (2009-2012) e in attesa di quelli del secondo run (2015-2018) ho poi contribuito ad altre tre analisi, riguardanti la ricerca di top squark in eventi con leptoni tau [498], in eventi con un leptone [464] e i vincoli posti da tutte le ricerche SUSY sullo spazio dei parametri del modello supersimmetrico minimale [476].

Tra il 2011 ed il 2013 ho coordinato le ricerche di squark della terza generazione. A causa del ruolo del quark stop nel cancellare le correzioni radiative alla massa del bosone di Higgs, queste ricerche hanno grande interesse ed hanno portato alla pubblicazione di sei articoli coi dati raccolti nel 2011 [171, 203, 205, 209, 213, 215] e sei articoli con quelli raccolti nel 2012 [285, 309, 310, 335, 343, 345] che sono stati completati sotto la mia direzione.

Tra il 2014 ed il 2016 sono stato coordinatore delle ricerche di supersimmetria di ATLAS, un gruppo di lavoro che include la partecipazione attiva di circa 300 ricercatori e studenti. Mi sono occupato del completamento delle analisi sui dati raccolti nel 2012 : 34 articoli [285, 286, 291, 292, 301, 307, 309, 310, 315, 322, 328, 335, 342, 343, 344, 345, 347, 374, 392, 404, 407, 409, 414, 421, 441, 450, 464, 468, 469, 476, 492, 494, 498, 529] sulla ricerca di SUSY sono stati pubblicati da ATLAS con tutta la statistica disponibile tra il 2013 ed il 2016. Inoltre mi sono occupato della preparazione e dello svolgimento delle analisi dei dati raccolti nel secondo run di LHC. Alla scadenza del mio mandato, 11 articoli erano stati sottomessi a rivista con i dati del 2015 [535, 537, 552, 558, 559, 563, 575, 580, 584, 585, 591].

Con l'aumentare della luminosità integrata disponibile, ricerche di particelle prodotte con minore sezione d'urto diventano sempre più interessanti. Tra Aprile 2017 e Marzo 2018 ho coordinato le ricerche di produzione mediante interazione elettrodebole di particelle supersimmetriche, occupandomi in particolare della pubblicazione delle analisi con i dati raccolti nel 2015 e 2016 [686,727]. Ho anche partecipato direttamente alle analisi per la ricerca di produzione diretta di leptoni scalari [PR32a, PR32b] e alla ricerca di neutralini e chargini con spettri di massa compressi [PR33, 727], uno scenario che si riteneva fosse accessibile solo a collisori leptonici. Ho poi contribuito ad un'analisi i cui risultati preliminari [PR34a, PR34b] mettono forti limiti sulla produzione diretta di chargini che decadono in bosoni W e neutralini, migliorando di oltre un fattore due i limiti precedenti esistenti.

Ho inoltre presentato a nome della collaborazione rassegne riguardanti i risultati delle analisi dei dati di LHC per ricerche di supersimmetria o di Nuova Fisica in generale a diverse conferenze internazionali [C9, C10, C11, C12, C13] e nazionali [C18, C19].

Esperimento ATLAS : rivelatore di vertice a Pixel

Tra il 1999 ed il 2009 ho lavorato al programma di ricerca e sviluppo legato alla costruzione del rivelatore (installato nel 2007) e al suo commissioning con raggi cosmici.

Ho partecipato alla realizzazione del programma di ricostruzione dei dati di test beam [PR5] e alla loro analisi, studiando la risoluzione spaziale, la raccolta di carica, l'efficienza, lo spessore di svuotamento e l'angolo di Lorentz dei rivelatori. In particolare ho sviluppato algoritmi per una migliore ricostruzione della posizione, ed un metodo per misurare la vita media dei portatori di carica in silicio irraggiato.

Ho sviluppato un modello dettagliato di raccolta delle coppie elettrone buca create da particelle cariche nei sensori, tenendo conto della variazioni di angolo di Lorentz con il campo elettrico e degli effetti di danneggiamento da radiazione.

Ho studiato con dati presi con un fascio ad alta intensità la dipendenza dell'efficienza di rivelazione e della risoluzione spaziale dalla sincronizzazione dell'elettronica di lettura rispetto alle particelle del fascio, nonché l'uniformità nella risposta temporale dei singoli canali di lettura.

Questi studi costituiscono il cuore della mia tesi di dottorato [PR2] e di una pubblicazione [18]. Sono anche documentati in tre note interne di ATLAS [PR3, PR4, PR6]. Essi hanno contribuito allo sviluppo del progetto definitivo del rivelatore a pixel [17] e ne ha dimostrato la capacità di fornire le prestazioni richieste anche dopo l'irraggiamento. Ho presentato questi studi in quattro conferenze internazionali [C1, C2, C3, C4].

Successivamente all'installazione del rivelatore in ATLAS, ho analizzato dati di raggi cosmici per verificarne il buon funzionamento, misurando nuovamente l'angolo di Lorentz. Ho inoltre sviluppato il software ufficiale di ATLAS per la ricostruzione delle coordinate dei clusters del rivelatore a pixel.

A partire dal 2016, faccio parte di un gruppo che studia gli effetti dei danni da radiazione, confrontando le predizioni di modelli numerici con i dati raccolti ad LHC. Il modello è stato utilizzato per decidere i parametri operativi del rivelatore a pixel (tensione di svuotamento e soglia) nel 2017 e 2018 ed è in corso di implementazione nel software ufficiale di simulazione del rivelatore di ATLAS. Il modello è anche utilizzato nelle previsioni delle prestazioni del rivelatore a pixel per l'upgrade di alta luminosità.

Esperimento ATLAS : altre attività

Da Ottobre 2017 sono coordinatore delle analisi di fisica e performance di ATLAS Italia, dopo aver svolto il ruolo di vice coordinatore nei dodici mesi precedenti. Il coordinatore delle analisi e' il punto di riferimento della comunità italiana di ATLAS per quanto riguarda l'analisi dati. Il suo ruolo è di promuovere la conoscenza delle attività compiute dai vari gruppi, favorirne l'aggregazione, segnalare situazioni di insufficienza o criticità e suggerire soluzioni per il loro

superamento; armonizzare l'utilizzo delle risorse di calcolo in contatto con il responsabile nazionale ed il responsabile di calcolo; occuparsi dell'assegnazione di presentazioni per conferenze nazionali (quali il congresso SIF e IFAE), della revisione delle presentazioni in questione e dei proceedings; organizzare un workshop annuale sulle analisi di Atlas Italia (l'ultimo si è tenuto a Pavia nell'ottobre 2017); valorizzare le attività nazionali in tutte le sedi opportune (ATLAS, workshops, conferenze, etc.) e svolgere un ruolo di riferimento nei confronti della commissione 1 per le attività di analisi nel loro complesso.

Da Dicembre 2016 sono coordinatore di *FastChain*, un progetto per ridurre la CPU necessaria per la produzione di eventi MonteCarlo di due ordini di grandezza. Il progetto ha un'importanza critica per ATLAS, in quanto le richieste di statistica di eventi Monte Carlo sono in continuo aumento con l'aumentare della luminosità integrata disponibile. Già oggi molte analisi di alto profilo hanno la statistica MonteCarlo tra le principali incertezze sistematiche. Il progetto è molto complesso, e riguarda la simulazione delle interazioni delle particelle con il rivelatore, la simulazione della raccolta del segnale nei vari rivelatori, e la ricostruzione delle tracce in eventi simulati. L'obiettivo è rendere *Fast Chain* il programma di simulazione di default per i campioni simulati prodotti per il run3 di LHC (2021-2023).

Sono stato il direttore del pannello di revisione (*editorial board*) di ATLAS per un articolo di ricerca di supersimmetria [708] e membro del pannello di altri quattro articoli : misura di spin correlation in $t\bar{t}$ [400], sezione d'urto di produzione $t\bar{t}$ in associazione a quark pesanti [266], sezione d'urto di produzione di bosoni W e Z con quark pesanti [90,91].

Attività di ricerca non legate ad ATLAS

MACRO (1997-1999) : Ho lavorato a questo esperimento sotto la supervisione del Prof. G. Giacomelli prima durante la mia tesi di laurea [PR1] e poi con una borsa di studio presso i Laboratori del Gran Sasso, da Aprile 1998 a Marzo 1999. Il rivelatore MACRO si trovava nei laboratori sotterranei del Gran Sasso, e studiava la componente penetrante e di alta energia dei raggi cosmici. Una delle linee principali di ricerca era la ricerca di monopoli magnetici supermassivi ($m \sim 10^{16}$ GeV) prodotti durante i primi istanti di vita dell'universo. Durante la tesi mi sono occupato di calcolare la perdita di energia nella materia di particelle con carica magnetica multipla di quella minima ($\hbar c/2e$) e di particelle con carica magnetica ed elettrica (dioni). Ho calcolato la perdita di energia all'interno della Terra per valutare l'angolo solido di accettazione del rivelatore in funzione della massa e della carica. Il risultato di questo lavoro é stato pubblicato su *Astroparticle Physics* [1]. Ho poi calcolato la perdita di energia dei monopoli negli scintillatori, nel gas dei tubi a streamer limitato e nel rivelatore nucleare a tracce di MACRO, e la risposta di questi rivelatori, lavoro pubblicato in un secondo articolo [2]. Ho poi effettuato un'analisi dei dati degli scintillatori

di MACRO per la ricerca di monopoli magnetici ed altre particelle fortemente ionizzanti, come i nucleariti [11].

RD50 (2002-2004) : La collaborazione RD50 si è formata per sviluppare rivelatori di vertice maggiormente resistenti alle radiazioni. Tra il 2002 ed il 2004 ho usato il programma di simulazione che avevo scritto per studiare il comportamento di rivelatori a pixel irraggiati per studiare la raccolta del segnale in funzione del materiale utilizzato (silicio Float-Zone standard ed ossigenato, silicio Czochralski ed epitassiale), del tipo di drogaggio (*n-on-p*, *n-on-n*, *p-on-n*), della geometria (spessore del sensore e dimensioni del pixel) e delle condizioni operative (temperatura, campo elettrico). Queste simulazioni consentono di guidare il processo di Ricerca e Sviluppo di nuovi rivelatori. Ho presentato questi studi in due conferenze internazionali [C4, C5].

Sviluppo di rivelatori a pixel di diamante (2002) : Durante il periodo trascorso a Bonn ho analizzato dati di test beam presi con rivelatori a pixel che usavano diamante come materiale sensibile. Tali rivelatori sono promettenti per la loro maggiore resistenza ai danni da radiazione, ma presentano ancora dei problemi di omogeneità e raccolta di carica in quanto utilizzano materiale policristallino. Analizzando questi dati e sfruttando l'elevata granularità dei rivelatori a pixel di ATLAS ho messo in luce per la prima volta come la ricostruzione della posizione sia influenzata dalla struttura policristallina del materiale, che provocava variazioni locali (al livello del singolo cristallo) dell'ordine di 20 micrometri nella posizione in cui veniva raccolta la carica rispetto alla posizione di passaggio della particella. Ho poi scritto un programma di simulazione per descrivere la raccolta di carica e la risposta di questi rivelatori a particelle ionizzanti, che ha permesso di spiegare il comportamento osservato nei dati come derivante dai campi elettrici di polarizzazione creati dalle cariche intrappolate nella regione di confine tra diversi cristalli. L'analisi e la simulazione dei dati presi con rivelatori al diamante è stata oggetto di una pubblicazione di cui io sono primo autore [4].

Attività didattica

Ho svolto attività didattica come assistente per i seguenti laboratori:

- Corso di Laboratorio di Fisica per Scienze Biologiche, Anno Accademico 1999/2000, Università degli Studi di Milano. Durante il corso venivano insegnati agli studenti i fondamenti del trattamento statistico delle misure e degli errori associati. L'esperimento di laboratorio consisteva nella misura della costante di Faraday utilizzando l'elettrolisi di una soluzione di CuSO_4 .

- Corso di Laboratorio di Programmazione 2, Anno Accademico 2003/04, Università degli Studi di Milano. Durante il corso si insegnava agli studenti la programmazione in linguaggio C. Veniva proposta un'esercitazione a scelta tra la simulazione di un esperimento (misura della relazione tra indice di rifrazione e lunghezza d'onda con uno spettrometro a prisma) e lo sviluppo di un programma per acquisire la funzione d'onda misurata da un'oscilloscopio e caratterizzare un circuito RLC.

A partire dall'anno accademico 2014-2015 alla data presente, sono membro del Collegio dei Docenti del corso di Dottorato in Fisica dell'Università di Milano.

Partecipazione a scuole e corsi di formazione

- Corso di formazione INFN *Corso di formazione manageriale per ricercatori e tecnologi INFN*, Legnaro, Ottobre 2017
- Corso di formazione INFN *Corso di comunicazione scientifica*, Milano, Maggio 2017
- XIII seminario di Fisica Nucleare e Subnucleare, Otranto, 21-27 Settembre 2000
- Giornate di Studio sui rivelatori, Torino 27 febbraio - 1 marzo 2001.
- Lezioni su software e calcolo Moderno, Torino 1-2 marzo 2001.
- IX corso specialistico su *linguaggio c++ ed analisi e disegno nella programmazione ad oggetti*, bologna, 26-30 marzo 2001.
- Scottish University Summer School in Physics on heavy flavour physics, St. Andrews (Scotland) 7-23 agosto 2001.

Lavori a stampa

Per le pubblicazioni su rivista, si veda l'elenco allegato alla domanda.

Tesi

- **PR1** T. Lari, Ricerca di monopoli magnetici con il rivelatore MACRO al Gran Sasso, **diploma thesis**, Bologna 1998.
- **PR2** T. Lari, Study of silicon pixel sensors for the ATLAS detector, **PhD thesis**, CERN-THESIS-2001-028, Milano 2001.

Note della collaborazione ATLAS

- **PR3** T. Lari, Alignment of irradiated and not irradiated pixel sensors in test-beam operation, ATL-INDET-2001-002.
- **PR4** T. Lari, *Lorentz angle variation with electric field for ATLAS silicon detectors*, ATL-INDET-2001-004.
- **PR5** A. Andreazza et al., H8 ATLAS Pixel test beam analysis program - User Guide, ATL-INDET-2003-009.
- **PR6** G. Alimonti et al., A study of charge trapping in irradiated silicon with test beam data, ATL-INDET-2003-014.
- **PR7** T. Lari, A Geant4 simulation of not irradiated and irradiated pixel detectors, ATL-INDET-2003-015.
- **PR8** T. Lari and G. Polesello, A study on the detection of a light stop quark with the ATLAS detector at LHC, ATL-PHYS-CONF-2006-001.
- **PR9** J. Abdallah et al., Prospects for SUSY discovery based on inclusive searches with the ATLAS detector at the LHC, ATL-COM-PHYS-2009-261.
- **PR10** B. Acharya et al., Prospects for measuring the Top Quark Pair Production Cross-section in the Single Lepton Channel at ATLAS in 10 TeV p-p Collisions, ATL-PHYS-INT-2009-071.
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- **PR12** M. Arrouche et al., Wenu and Zee observations supporting note, ATL-PHYS-INT-2010-109.
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