# CATIA MILARDI

Catia Milardi is Research Director at the National Laboratories of INFN in Frascati where she has been working since more than 30 years.

In 2006, she has been appointed leader of the DAFNE collider operations. In this context, she worked to undertake several accelerator studies and upgrades aimed at establishing the guidelines for possible future projects, while ensuring successful data taking to the KLOE and FINUDA experiments. In 2009, she had a primary role in designing and implementing a new collision scheme, the so called “Crab-Waist” one, which improved DAFNE’s luminosity by a factor of three and opened new perspectives for flavour physics experiments at the Frascati laboratories.

Since 2010, as Scientific Head of the DAFNE Accelerator Complex, she has been leading the effort to integrate the Crab-Waist approach with a large detector set-up, KLOE-2, designing the new interaction region, coordinating commissioning, machine studies, data taking phase and eventually bringing the physics run to a successful end.

Presently she is coordinating the scientific program aimed at providing data to the SIDDHARTA-2 experiment. In this context, she lead the effort to design and build, in collaboration with the ESRF magnet experts, the new permanent magnet quadrupoles for the DAFNE collider interaction region.
She is member of the SuperKEKB Scientific Committee.

# MAURO MIGLIORATI
# Curriculum Vitae

Place Rome
Date 2/12/2020

## Education

| Type | Year | Institution | Notes (Degree, Experience,…) |
|---|---|---|---|
| PhD | November 1996 | University of Rome "LA SAPIENZA" | Applied Electromagnetism and Electro-physical Science, VIII cycle. Thesis on beam dynamics collective effects in a circular accelerator |
| Licensure | 1993 | University of Rome "LA SAPIENZA" | Licensure for the profession of engineer |
| University graduation | 1992 | University of Rome "LA SAPIENZA" | Degree in Nuclear Engineering with a dissertation on the study and simulation of the longitudinal beam dynamics in DAΦNE - 110/110 e lode |

## Appointments

Academic Appointments

| Start | End | Institution | Position |
|---|---|---|---|
| October 2015 | | | Associate Professor at La Sapienza, Department "Scienze di Base e Applicate per l'Ingegneria" (SBAI) |
| September 1997 | September 2015 | University of Rome "LA SAPIENZA" | Researcher at University of Rome La Sapienza, Department "Scienze di Base e Applicate per l'Ingegneria" (SBAI) |
| February 2014 | | JUAS (Joint University Accelerator School) | Member of the JUAS Advisory Board. JUAS is a school of accelerator physics, technology and applications organized by ESI (European Scientific Institute) and supported by 15 partners European Universities under the patronage of CERN |
| 2012 | | University of Rome "LA SAPIENZA" | Member of the Academic Board of the PhD in Accelerator Physics of University of Rome La Sapienza |
| December 2006 | November 2009 | University of Rome "LA SAPIENZA", Energetics Department (now SBAI) | Member of the Department Board (Giunta di Dipartimento) |
| January 1999 | January 2001 | University of Rome "LA SAPIENZA", Energetics Department (now SBAI) | Member of the Department Board (Giunta di Dipartimento) |
| | | Technische Universität Wien (AT), Universität Rostock (DE), Université Grenoble | Invited member of a PhD commission for the final defense in theses on particle |

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| | | Alpes (FR), Université Paris-Sud (FR), Université Blaise Pascal Clermont-Ferrand (FR), Ecole Polytechnique Federale de Lausanne (CH), Université Joseph Fourier Grenoble (FR) | accelerators in several European Universities |
| | | University of Rome "LA SAPIENZA" | Supervisor of PhD theses in Accelerator Physics, master theses in Aerospace and Electronic Engineering, assistant supervisor of PhD thesis in Applied Electromagnetism |
| | | | Member of several committees for research grants in the Department of Energetics and SBAI |

Research Appointments

Coordination of national and international researcher teams

| Start | End | Institution | Position |
|---|---|---|---|
| May 2018 | April 2020 | CERN | Technical coordinator of a collaboration agreement for the studies of impedance and impedance reduction measures for crystal collimators goniometers in the framework of the High Luminosity upgrade for the LHC at CERN. |
| January 2018 | December 2021 | H2020 project Accelerator Research and Innovation for European Science and Society (ARIES) | Coordinator of the task 6.4 of the H2020 project Accelerator Research and Innovation for European Science and Society (ARIES), concerning the study of improved beam stabilization, with the aim of reviewing the existing strategies and methods for beam-impedance assessments and impedance models for future accelerators. |
| January 2015 | | CERN – Geneva - CH | Coordinator and responsible of the collective effects group for the Future Circular e+e- Collider (FCC-ee). |
| November December 2014 | | CERN – Geneva - CH | Coordinator of a Collaboration Agreement between CERN – Beams Department and SBAI Department aimed at the upgrade of the LHC and its Injectors |

Integration in the Particle Accelerator international community

| Start | End | Institution | Position |
|---|---|---|---|
| March 2020 | March 2020 | 8th Low Emittance Rings workshop 2020 | Invited talk at the 8th Low Emittance Rings workshop 2020 (March 2020, cancelled) in Frascati (IT) on "Collective effects in FCC-ee" |

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|---|---|---|---|
| September 2019 | September 2019 | ICFA mini-Workshop on Mitigation of Coherent Beam Instabilities in Particle Accelerators | Invited talk (workshop opening talk) at the ICFA mini-Workshop on Mitigation of Coherent Beam Instabilities in Particle Accelerators held in September 2019 in Zermatt (CH) on “Review of impedance-induced instabilities and possible mitigations” |
| September 2019 | September 2019 | ICFA mini-Workshop on Mitigation of Coherent Beam Instabilities in Particle Accelerators | Member of the International Advisory Committee of the ICFA mini-Workshop on Mitigation of Coherent Beam Instabilities in Particle Accelerators held in September 2019 in Zermatt (CH). |
| June 2019 | June 2019 | Fifth International Future Circular Collider (FCC) Conference | Invited talk at the Fifth International Future Circular Collider (FCC) Conference held in June 2019 in Brussels, (BE) on “Collective effects in the booster synchrotron” |
| June 2019 | June 2019 | Fifth International Future Circular Collider (FCC) Conference | Invited talk at the Fifth International Future Circular Collider (FCC) Conference held in June 2019 in Brussels, (BE) on “Collective effects with ttbar configuration” |
| December 2018 | December 2018 | Accelerator Research and Innovation for European Science and Society (ARIES) | Member of the International Advisory Committee of the workshop on Accelerator Performance and Concepts held in December 2018 in Frankfurt am Main (DE). |
| April 2018 | April 2018 | Future Circular Collider (FCC) | Chairman of the second FCC-hh accelerator review session on collective effects during the FCC week 2018 held in Amsterdam (NL) in April 2018. |
| November 2017 | June 2018 | electron-cloud workshop, ECLOUD'18 | Member of the International Advisory Committee of the electron-cloud workshop, ECLOUD'18, held in Elba (Italy) in June 2018. |
| September 2017 | September 2017 | ICFA mini-Workshop on Impedances and Beam Instabilities in Particle Accelerators | Invited talk at the Workshop on Impedances and Beam Instabilities in Particle Accelerators held in Benevento (Italy) in September 2017 on “Impedance and instabilities in lepton machines” |
| May 2017 | May 2017 | Future Circular Collider (FCC) | Chairman of the session on FCC-hh machine design - Review: Beam Performance and Specifications during the FCC week 2017 held in Berlin (DE) in May-June 2017. |
| October 2016 | September 2017 | ICFA mini-Workshop on Impedances and Beam Instabilities in Particle Accelerators | Member of the International Advisory Committee of the Workshop on Impedances and Beam Instabilities in Particle Accelerators held in Benevento (Italy) in September 2017. |
| February 2016 | May 2017 | International Conference on Particle Accelerators | Member of the Scientific Advisory Board of the International Conference on Particle Accelerators held in Copenhagen (Denmark) 14 - 19 May 2017. IPAC is the most important world conference which is hold annually in the field of particle accelerators |

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| | | | hosting more than 1000 scientists from all over the world. |
| October 2016 | October 2016 | ICFA Advanced Beam Dynamics Workshop on High Luminosity Circular e+e- Colliders | Invited talk at the 58th ICFA Advanced Beam Dynamics Workshop on High Luminosity Circular e+e- Colliders (Daresbury, UK, 24-27/10/2016) on "Collective effects issues for FCC-ee" |
| April 2016 | April 2016 | Future Circular Collider (FCC) | Invited talk at the FCC study week 2016 (Rome 11-15/04/2016) on "Single-beam collective effects in FCC-ee" |
| April 2016 | April 2016 | Future Circular Collider (FCC) | Member of the Organizing committee of the Future Circular Collider (FCC) study week 2016 (Rome 11-15/04/2016). |
| September 2015 | September 2015 | European Network for Novel Accelerators (EuroNNAc2) | Member of the International Advisory Committee for the 2nd European Advanced Accelerator Concepts Workshop, held in Elba Island (Italy) 13-19/09/2015. |
| February 2013 | June 2014 | International Conference on Particle Accelerators | Member of the Scientific Advisory Board of the International Conference on Particle Accelerators held in Dresden (Germany) 15 - 20 June 2014. IPAC is the most important world conference which is held annually in the field of particle accelerators hosting more than 1000 scientists from all over the world. |
| March 2010 | March 2010 | INFN - LNF | Organizer and co-chairman of the Workshop on Microbunching Instability |
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| | | | Guest editor of a special issue of the Journal "Coatings" (ISSN 2079-6412; CODEN: COATED) on "Coating Materials and Surface Treatments for Applications in Particle Accelerators" (https://www.mdpi.com/journal/coatings/special_issues/part_accel). |
| | | | Referee of: Physical Review Letters, Physical Review Special Topics - Accelerators and Beams, European Physical Letters, Scientific Reports, Journal of Instrumentation |

Research activity in qualified international institutions

| Start | End | Institution | Position |
|---|---|---|---|
| August | July | CERN – Geneva – CH | Cooperation Associate |

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|---|---|---|---|
| 2019 | 2020 | | |
| February 2019 | July 2019 | CERN – Geneva – CH | Project Associate working on the upgrade of the LHC injectors |
| February 2018 | July 2018 | CERN – Geneva – CH | Project Associate working on the upgrade of the LHC injectors |
| February 2017 | July 2017 | CERN – Geneva – CH | Project Associate working on the upgrade of the LHC injectors |
| February 2016 | July 2016 | CERN – Geneva – CH | Project Associate working on the upgrade of the LHC injectors |
| February 2014 | July 2014 | CERN – Geneva – CH | Scientific Associate working on the upgrade of the LHC injectors |
| February 2013 | July 2013 | CERN – Geneva – CH | Scientific Associate working on the upgrade of the LHC injectors |
| February 2012 | July 2012 | CERN – Geneva – CH | Scientific Associate working on the upgrade of the LHC injectors |
| August 2014 | July 2015 | CERN – Geneva – CH | Visiting Scientist |
| February 2000 | February 2000 | CERN – Geneva - CH | Unpaid Scientific Associate |
| October 2000 | October 2000 | CERN – Geneva – CH | Scientific Collaboration |
| February 1997 | March 1997 | Advanced Light Source Centre of University of California, Lawrence Berkeley National Laboratory - USA | Invited Scientific Collaboration |

Research activity in qualified national institutions

| Start | End | Institution | Position |
|---|---|---|---|
| September 1992 | August 1997 | Laboratori Nazionali di Frascati dell'Istituto Nazionale di Fisica Nucleare | Research activity in the DAΦNE project regarding study and simulations of particle beams in the group of the Accelerator Division. |
| 2012 | | INFN - Roma1 | Research appointment renewed yearly on particle accelerators activities |
| 2008 | 2011 | INFN - LNF | Research appointment renewed yearly on particle accelerators activities |
| 1998 | 2007 | INFN - LNF | Association appointment renewed yearly on particle accelerators activities |

**Teaching experience**

PhD and International teaching experience

| Year | Institution | Lecture/Course |
|---|---|---|
| Since 2015 | PhD in Accelerator Physics of University of Rome La Sapienza | Longitudinal and Transverse Beam Dynamics in Circular Accelerators |
| 2013-2015 | PhD in Accelerator Physics of University of Rome La Sapienza | Wakefields and Instabilitites |
| Since January 2010 | JUAS (Joint University Accelerator School) | Space charge and instabilities |

National teaching commitments

| Year | Institution | Lecture/Course |
|---|---|---|
| Since AA 1998-99 | University of Rome La Sapienza | Courses of General Physics and Physics Laboratories for the first two years of the Engineering Faculty (Aerospace, Electronics, Telecommunications, …) |
| Since AA 2017-18 | University of Rome La Sapienza | Course of Medical Physics for Medicine and Surgery (B channel) |

**Society memberships**

| Year | Title |
|---|---|
| Since 2013 | Member of SIF (Società Italiana di Fisica) and EPS (European Physical Society) |

**Research Activities**

| Keywords | Brief Description |
|---|---|
| • Beam dynamics in LINACS<br>• Proton beam transport of post-accelerated particles<br>• Applications to: diagnostics, medicine, material science. | • Participation to SPARC and SPARX projects of INFN-LNF, co-financed by the Ministry of Education and involving the collaboration of several Italian research institutions including ENEA, and CNR.<br>• Participation to the commissioning of SPARC photoinjector.<br>• Beam dynamics studies in high brightness photo-injectors.<br>• Participation to the European Extreme Light Infrastructure project for developing an innovative machine design for high brilliance Compton-X and Gamma-photon beams: Beam dynamics and collective effects in LINACS.<br>• Activity on laser generated protons: it is a novel technique for the generation and acceleration of proton beams, which arises when an intense laser hits a solid target. The advantage of this new type of source, for which much work still needs to be done, is that one can reach very high energies in short distances. Laser generated proton beams could be of great importance for the development of accelerators for medical applications at relatively low cost. I've worked on the study of the characteristics of the beams produced by laser-plasma interaction, their transport and post-acceleration.<br>• Design of LINACS for medical applications. A collaboration with Sordina |

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| | IORT Technologies (SIT), a world leader in manufacturing dedicated electron linear accelerators for IOeRT (Intra-Operative electron Radiation Therapy) is in progress and a patent for an S-band LINAC for FLASH therapy has been requested by the collaboration. |
| • Electron beam transport of laser-driven plasma accelerators | • Activity on laser generated electrons: when an intense laser hits a gas jet, under some conditions it produces electrons with characteristics almost comparable with those which are obtained today in particle accelerators. The accelerating field of conventional accelerators is limited by breakdown issues, which leads to maximum accelerating gradients currently slightly higher than 100 MeV/m (at a reasonable breakdown rate and using standing wave structures). Laser- driven plasma accelerators can generate accelerating electric fields up to hundreds of GV/m, producing high energy electron beams in distances of a few centimeters. In this context, I've been scientific responsible of an activity within the CRISP project (FP7 Infrastructures): electron beam transport and its characterization. |
| • Beam dynamics and collective effects in circular accelerators<br>• Accelerators: DAΦNE, CERN PS, LHC, Future Circular Collider | • Collaboration with two main institution: the Accelerator Division of Frascati National Laboratories (LNF) of the National Institute of Nuclear Physics (INFN), and the group of Accelerator Beam Physics (ABP) of the Beam Department at CERN.<br>• Study of the beam dynamics under the influence of coherent instabilities produced by electromagnetic fields (wakefields) arising from the interaction of a charged beam with the surrounding environment. The high intensity beams can produce instabilities which can compromise the performance of a machine.<br>• Development of several simulation codes taking into account self-induced wakefields, that have been used in different machines: DAΦNE, CERN Proton Synchrotron, Future Circular Collider. |
| • Machine measurements | • Participation to a series of measurements on the longitudinal beam dynamics at the Advanced Light Source at Lawrence Berkeley National Laboratory (USA)<br>• Participation to the commissioning of the DAΦNE accelerator, at the Frascati National Laboratories of the National Institute of Nuclear Physics<br>• Measurements of single and multi-bunch instabilities produced by electromagnetic wakefields.<br>• Machine measurements at CERN related to collective effects and beam instabilities. |
| • Wake fields and impedance evaluation of accelerator devices | • Studies, simulations and experimental measurements to determine the electromagnetic fields and the coupling impedances of devices and of whole accelerators.<br>• Measurements for the characterization of electromagnetic devices found in the vacuum chamber of accelerators and for diagnostics, also using instrumentation of our RF and microwave laboratory in the SBAI Department.<br>• Analytical evaluation of coupling impedance and wakefields of accelerators devices. |

Elenco dei lavori del Prof. **Mauro Migliorati**

Pubblicazioni su rivista:

P1. M. Behtouei, L. Faillace, B. Spataro, A. Variola, **M. Migliorati**, *A novel exact analytical expression for the magnetic field of a solenoid*, **Waves in Random and Complex Media**, (2020).
doi: 10.1080/17455030.2020.1842554.

P2. C. Verona, M. Marinelli, S. Palomba, G. Verona-Rinati, M. Salvadori, F. Consoli, M. Cipriani, P. Antici, **M. Migliorati**, F. Bisesto and R. Pompili, *Comparison of single crystal diamond TOF detectors in planar and transverse configuration*, **Journal of Instrumentation**, Vol. 15, C09066 (2020).
doi: 10.1088/1748-0221/15/09/C09066.

P3. M. Behtouei, L. Faillace, B. Spataro, A. Variola, **M. Migliorati**, *A SW Ka-Band linearizer structure with minimum surface electric field for the compact light XLS project*, **Nuclear Instruments and Methods in Physics Research**, A 984 (2020), 164653.
doi: 10.1016/.nima.2020.164653.

P4. E. Métral, **M. Migliorati** *Longitudinal and transverse mode coupling instability: Vlasov solvers and tracking codes*, **Physical Review Accelerators and Beams**, 23, 071001 (2020).
doi: 10.1103/PhysRevAccelBeams.23.071001.

P5. M. Salvadori, F. Consoli, C. Verona, M. Cipriani, P. L. Andreoli, G. Cristofari, R. De Angelis, G. Di Giorgio, D. Giulietti, M.P. Anania, F. Bisesto, G. Costa, M. Ferrario, M. Galletti, R. Pompili, A. Zigler, P. Antici, **M. Migliorati**, *Assessment of sensitivity improvement for Time-Of-Flight schemes in experiments with high intensity lasers*, **Journal of Instrumentation**, Vol. 15, C10002 (2020).
doi: 10.1088/1748-0221/15/10/C10002.

P6. The FCC Collaboration, *FCC Physics Opportunities: Future Circular Collider Conceptual Design Report Volume 1*, **European Physical Journal C**, 79:474 (2019).
doi: 10.1140/epjc/s10052-019-6904-3.

P7. The FCC Collaboration, *FCC-ee: The Lepton Collider: Future Circular Collider Conceptual Design Report Volume 2*, **European Physical Journal Special Topics**, 228, 261-623 (2019).
doi: 10.1140/epjst/e2019-900045-4.

P8. The FCC Collaboration, *FCC-hh: The Hadron Collider: Future Circular Collider Conceptual Design Report Volume 3*, **European Physical Journal Special Topics**, 228, 755-1107 (2019).
doi: 10.1140/epjst/e2019-900087-0.

P9. The FCC Collaboration, *HE-LHC: The High-Energy Large Hadron Collider: Future Circular Collider Conceptual Design Report Volume 4*, **European Physical Journal Special Topics**, 228, 1109-1382 (2019).
doi: 10.1140/epjst/e2019-900088-6.

P10. M. Salvadori, P.L. Andreoli, S. Bollanti, F. Bombarda, M. Cipriani, F. Consoli, G. Cristofari,bR. De Angelis, G. Di Giorgio, F. Flora, D. Giulietti, L. Mezi, **M. Migliorati**, M.A. Alkhimova, S. Pikuz, T. Pikuz and R. Kodama, *A laser-produced plasma X-ray source for contact microscopy*,

**Journal of Instrumentation**, Vol. 14, 3, C03007 (2019).
doi: 10.1088/1748-0221/14/03/C03007.

P11. A. Morabito, M. Scisciò, S. Veltri, **M. Migliorati**, and P. Antici, *Design and optimization of a laser-PIXE beamline for material science applications*, **Laser and Particle Beams**, 1-10 (2019).
doi: 10.1017/S0263034619000600.

P12. **M. Migliorati**, L. Palumbo, C. Zannini, N. Biancacci, and V. G. Vaccaro, *Resistive wall impedance in elliptical multilayer vacuum chambers*, **Physical Review Accelerators and Beams**, 22, 121001 (2019).
doi: 10.1103/PhysRevAccelBeams.22.121001.

P13. **M. Migliorati**, S. Aumon, E. Koukovini-Platia, A. Huschauer, E. Métral, G. Sterbini, and N. Wang, *Instability studies at the CERN Proton Synchrotron during transition crossing*, **Physical Review Accelerators and Beams**, 21, 120101 (2018).
doi: 10.1103/PhysRevAccelBeams.21.120101.

P14. N. Biancacci, **M. Migliorati**, M. R. Masullo, L. Palumbo, and V. G. Vaccaro, *Space charge impedance and electromagnetic fields in elliptical vacuum chambers*, **Physical Review Accelerators and Beams**, 21, 124201 (2018).
doi: 10.1103/PhysRevAccelBeams.21.124201.

P15. **E**. Belli, P. Costa Pinto, G. Rumolo, A. Sapountzis, T. Sinkovits, M. Taborelli, B. Spataro, M. Zobov, G. Castorina, and **M. Migliorati**, *Electron cloud buildup and impedance effects on beam dynamics in the Future Circular $e^+$ $e^-$ Collider and experimental characterization of thin TiZrV vacuum chamber coatings*, **Physical Review Accelerators and Beams**, 21, 111002 (2018).
doi: 10.1103/PhysRevAccelBeams.21.111002.

P16. M. Scisciò, **M. Migliorati**, L. Palumbo, and P. Antici, *Design and optimization of a compact laser-driven proton beamline*, **Scientific Reports**, 8:6299 (2018).
doi: 10.1038/s41598-018-24391-2.

P17. **M. Migliorati**, E. Belli, M. Zobov, *Impact of the resistive wall impedance on beam dynamics in the Future Circular $e^+$ $e^-$ Collider*, **Physical Review Accelerators and Beams**, 21, 041001 (2018).
doi: 10.1103/PhysRevAccelBeams.21.041001.

P18. N. Biancacci, **M. Migliorati**, L. Palumbo, S. Persichelli, and V. G. Vaccaro, *Electromagnetic fields and Green functions in elliptical vacuum chambers*, **Physical Review Accelerators and Beams**, 20, 101004 (2017).
doi: 10.1103/PhysRevAccelBeams.20.101004.

P19. D. Alesini, M. Bellaveglia, S. Bini, F. Cardelli, L. Ficcadenti, A. Gallo, V. Lollo, **M. Migliorati**, A. Mostacci, L. Palumbo, L. Pellegrino, V. Pettinacci, L. Piersanti, and S. Tocci, *Design of high gradient, high repetition rate damped C-band rf structures*, **Physical Review Accelerators and Beams**, 20, 032004 (2017).
doi: 10.1103/PhysRevAccelBeams.20.032004.

P20. R. Bartolini, S. Casalbuoni, M. P. Cox, S. Gerstl, A. W. Grau, T. Holubek, E. C. Longhi, **M. Migliorati**, G. Rehm, D. Saez de Jauregui, J. C. Schouten, B. Spataro, R. Voutta, and R. P. Walker, *Cold vacuum chamber for diagnostics: Analysis of the measurements at the Diamond Light*

*Source and impedance bench measurements*, **Physical Review Accelerators and Beams**, 19, 053201 (2016).
doi: 10.1103/PhysRevAccelBeams.19.053201.

P21. N. Biancacci, S. Gilardoni, E. Métral, **M. Migliorati**, S. Persichelli, and B. Salvant, *Transverse beam coupling impedance of the CERN Proton Synchrotron*, **Physical Review Accelerators and Beams**, 19, 041001 (2016).
doi: 10.1103/PhysRevAccelBeams.19.041001.

P22. R. Fedele, T. Akhter, S. De Nicola, **M. Migliorati**, A. Marocchino, F. Massimo, and L. Palumbo, *The concept of coupling impedance in the self-consistent plasma wake field excitation*, **Nuclear Instruments and Methods in Physics Research**, A 829 (2016), pp. 397-402.
doi: 10.1016/j.nima.2016.03.105.

P23. M. Scisciò , L. Lancia, **M. Migliorati**, A. Mostacci, L. Palumbo, Y. Papaphilippou, and P. Antici, *Parametric study of transport beam lines for electron beams accelerated by laser-plasma interaction*, **Journal of Applied Physics**, 119, 094905 (2016).
doi: 10.1063/1.4942626.

P24. **M. Migliorati**, L. Palumbo, *Multibunch and multiparticle simulation code with an alternative approach to wakefield effects*, **Physical Review Special Topics - Accelerators and Beams**, 18, 031001 (2015).
doi: 10.1103/PhysRevSTAB.18.031001.

P25. A. Cianchi, V. Balandin, M. Castellano, E. Chiadroni, L. Catani, N. Golubeva, K. Honkavaara, G. Kube, and **M. Migliorati**, *First non-intercepting emittance measurement by means of optical diffraction radiation interference*, **New Journal of Physics**, 16, 113029 (2014).
doi: 10.1088/1367-2630/16/11/113029.

P26. R. Bartolini, S. Casalbuoni, M. P. Cox, S. Gerstl, A. W. Grau, T. Holubek, E. C. Longhi, **M. Migliorati**, G. Rehm, D. Saez de Jauregui, J. C. Schouten, G. Sikler, B. Spataro, R. Voutta, and R. P. Walker, *Cold vacuum chamber for diagnostics: Instrumentation and first results*, **Physical Review Special Topics - Accelerators and Beams**, 17, 103201 (2014).
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P112. S. De Santis, **M. Migliorati**, L. Palumbo, M. Zobov, *Coupling impedance of a hole in a coaxial beam pipe*, **Physical Review**, E 54 (1996), pp. 800-805, anche DAΦNE Technical note G-36, Frascati, December 18, 1995.

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# Simone Di Mitri, Curriculum Vitae

| | |
|---|---|
| First, Last Name | Simone Di Mitri. |
| Contacts | Email: simone.dimitri@elettra.eu. Office: +39 040 375 8778. |
| Keywords | Particle beam dynamics. Light sources. Teaching. |
| Present Position | Senior staff scientist, Accelerators Group, Elettra Sincrotrone Trieste.<br>Contract Professor of Particle Accelerator Physics, Univ. of Trieste. |

## Educational & Professional Record

| | |
|---|---|
| 2006/02 - to date | Senior staff scientist, Accelerators Group, Elettra Sincrotrone Trieste |
| 2002/04 - 2006/02 | Junior scientist, Accelerators Group, Elettra Sincrotrone Trieste |
| 2008/09 - 2011/10 | Ph.D. in Accelerator Physics, Dept. of Mathematics and Natural Sciences, University of Groningen, The Netherlands. Title: *Machine design and electron beam control of a single-pass linac for free electron laser: the FERMI@Elettra case study*. |
| 1995/09 - 2000/10 | Master Degree in Nuclear and Sub-Nuclear Physics, University of Pisa, Italy. Experimental Thesis in Accelerator Physics at the INFN-LNF, Rome, Italy. Title: *Single particle dynamics in the presence of sextupole nonlinearities in the electron-positron collider Daphne*. |
| 1990/09 - 1995/07 | Bachelor Degree, Senior High School "G. Galilei", Terni, Italy. |

## Professional Services

***International Committees***

| | |
|---|---|
| 2010 - 2022 | Scientific Program Committee of the International FEL Conference (chair in 2022). |
| 2016 - 2020 | Scientific Advisory Board of the International Particle Accelerator Conference. |
| 2020 - 2021 | Scientific Advisory Committee of the Uppsala Univ. compact x-ray source (Sweden). |
| 2018 - 2021 | Scientific Advisory Committee of the MAX-IV FEL (Sweden). |
| 2011 - 2013 | Beam Dynamics Review Committee of the Pohang Accelerator Laboratory FEL (South Korea). |

***Spokeperson at EU-Projects***

| | |
|---|---|
| 2020/01 - to date | Co-spokeperson for Light Sources in the *League of European Accelerator-based Photon Sources*. |
| 2017/10 - to date | Topic leader for FELs in the *League of European Accelerator-based Photon Sources*. |
| 2013/01 - 2015/12 | Spokeperson for beam microbunching and compression for seeded FELs in *FELs of Europe*. |
| 2005/01 - 2008/12 | Spokeperson for particle collective instabilities in FELs for *EUROFEL*. |

***Organization of Workshops***

| | |
|---|---|
| 2017/09 | Chairman of the Intern. ICFA mini-Workshop on Nonlinear Dynamics and Collective Effects in Particle Beams (NOCE), Arcidosso, Italy. |
| 2007 - 2014 | Member of the Organizing and Program Committee of the I–VI International Workshops on Microbunching Instability. |

## Teaching

***National Schools***

| | |
|---|---|
| 2020/2021 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Physics, FIS/04, 6 CFU, 48 hours. |
| 2019/2020 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Physics, FIS/04, 6 CFU, 48 hours. |
| 2018/2019 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Physics, FIS/04, 6 CFU, 48 hours. |
| | Faculty member for the Friuli Venezia Giulia regional project *Pages4*, High Schools, 6 hours. |
| 2017/2018 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Physics, FIS/04, 6 CFU, 48 hours. |
| | Faculty member for the Friuli Venezia Giulia regional project *Pages3*, High Schools, 6 hours. |
| 2016/2017 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Physics. FIS/04, 6 CFU, 48 hours. |
| | Faculty member for the Friuli Venezia Giulia regional project *Pages2*, High Schools, 6 hours. |
| 2015/2016 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Engineering and Architecture, FIS/01, 6 CFU, 48 hours. |
| 2014/2015 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Engineering and Architecture, FIS/01, 6 CFU, 48 hours. |
| 2013/2014 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Engineering and Architecture, FIS/01, 6 CFU, 48 hours. |
| 2012/2013 | Contract Professor of Particle Accelerator Physics, Univ. of Trieste, Dept. of Engineering and Architecture, FIS/01, 6 CFU, 48 hours. |

***International Schools***

| | |
|---|---|
| 2019 | Instructor at the Italian School on Synchrotron Light Sources, Trieste, Italy; 2 hours. |
| 2016 | Instructor at Cern Accelerator School: Advanced Course on ERLs and FELs, Hamburg, Germany; 4 hours. |
| 2015 | Instructor at U.S. Particle Accelerator School: Linac Design for FELs, Rutgers University, East Brunswick, NJ, U.S.A.; 40 hours. |
| 2014 | Faculty of Accelerator Physics at the International Nathiagali Summer College, Islamabad, Pakistan; 6 hours. |
| 2013 | Instructor at U.S. Particle Accelerator School: Linac Design for FELs, Colorado State University, Fort Collins, CO, U.S.A.; 40 hours. |
| 2005 | Tutor at Cern Accelerator School (Advanced), Trieste, Italy; 4 hours. |

## Students Supervision & Thesis Review

| | |
|---|---|
| 2019 - 2022 | 2 Ph.D. st., Univ. of Trieste, Dept. of Physics. |
| 2017 - 2019 | 6 Graduate st., Univ. of Trieste, Dept. of Physics and Dept. of Engineering. |
| 2017 - 2018 | 2 PhD Thesis reviews, Univ. of Hamburg and Univ. of Rome La Sapienza. |

## Third Mission

| | |
|---|---|
| 2016/03 - 2017/12 | Responsible for 1-week scientific-industrial user beam time at the FERMI FEL. |
| 2016/03 - 2017/03 | Responsible for the simulation of an energy-recovery UV FEL for industrial application in nano-litography. |
| 2015/11 - 2016/07 | Responsible for the specification of parameters and relaibility of an energy-recovery UV FEL for industrial application in nano-litography. |
| 2015/09 - 2015/10 | Responsible for the magnetic lattice design of an energy-recovery UV FEL for industrial application in nano-litography. |

# List of Talks

| | |
|---|---|
| 05/2020 - Invited | IPAC20 (Caen, France): *Mitigation of microbunching instability for improved FEL spectral brilliance* |
| 11/2019 - Invited | Canadian-Italian Workshop on Future light Sources (Trieste, Italy): *Short pulse options at a diffraction limited storage ring*. |
| 10/2019 - Invited | Uppsala Univ. (Sweden): *On electron beam brightness for compact X-ray sources* |
| 09/2019 - Contrib. | SILS (Camerino, Italy): *Laser-slicing at a diffraction limited storage ring* |
| 05/2019 - Invited | HDZR (Dresda, Germany): *Spectro-temporal pulse shaping at FERMI FEL* |
| 12/2018 - Invited | Time-resolved Experiments at new synchrotron radiation facilities (Trieste, Italy): *Overview of time-resolved schemes for synchrotrons* |
| 09/2018 - Invited | 8th German-Russian Travelling Seminar (Trieste, Italy): *How do synchrotrons and free-electron lasers work?* |
| 04/2018 - Invited | Canadian-Italian Workshop on Future light Sources (Saskatoon, Canada): *Elettra 2.0, the machine* and *FERMI, the machine*. |
| 03/2018 - Contrib. | FLS18 (Shanghai, China): *Compact Arc Compressor for FEL-Driven Compton Light Source and ERL-Driven UV FEL*. |
| 10/2017 - Invited | Univ. of Chicago (Chicago, IL): *Benchmarking coherent synchrotron radiation*. |
| 09/2017 - Contrib. | SIF (Trento, I): *Design study of high gradient, low impedance accelerating structures for the FERMI free-electron laser linac upgrade*. |
| 10/2016 - Contrib. | NAPAC (Chicago, IL, USA): *Operating Synchrotron Light Sources with a High Gain Free Electron Laser*. |
| 09/2016 - Contrib. | IRMMTHz Conf. (Copenhagen, DK): *THz Coherent Transition Radiation at TeraFERMI: Commissioning Results*. |
| 09/2016 - Contrib. | SIF (Padova, I): *The FERMI Seeded FEL Facility: Operational Experience and Future Perspectives*; *Operating Synchrotron Light Sources with a High Gain Free Electron Laser*. |
| 08/2016 - Invited | Designing Future X-ray FELs (Daresbury, UK): *Modelling Linacs and their Components*. |

02/2016 - Contrib. TWIICE-2 (Abingdon, UK): *Operating synchrotron light sources with a high gain free electron laser*.

08/2015 - Invited Intern. FEL Conf. (Daejeon, South Korea): *Estimate of free electron laser gain length in the presence of collective effects*.

07/2015 - Contrib. SILS (Trento, I): *Operating synchrotron light sources with a high gain free electron laser*.

06/2015 - Invited ERL Workshop (Stony Brook Univ., NY): *Transverse emittance-preservign arc compressor*.

01/2015 - Invited CLIC Workshop (CERN): *Exotic schemes of electron beam manipulation*.

09/2014 - Contrib. SIF (Pisa, I): *Theoretical and experimental advances on Coherent Synchrotron Radiation and Microbunching Instability at FERMI*.

02/2014 - Invited ASTEC (Daresbury, UK): *Opportunities for electron beam and FEL studies at CLARA*.

09/2013 - Invited ALBA-CELLS (Barcelona, ES): *Introduction to FERMI FEL: Physics Studies*. Introduction to `elegant`.

08/2013 - Invited Intern. FEL Conf. (New York, NY, USA): *Emittance control in the presence of collective effects in the FERMI@Elettra FEL linac driver.*

06/2013 - Invited High Gradient Workshop (Trieste, Italy): *Electron beam brightness in NC linac-driven x-ray FELs*.

05/2013 - Invited 5th Microbunching Instability Workshop (Pohang, South Korea): *Suppression of microbunching instability with a magnetic chicane at FERMI@Elettra*.

05/2013 - Invited 5th Microbunching Instability Workshop (Pohang, South Korea): *Cancellation of CSR kicks with optics balance*.

04/2012 - Invited LBNL (Berkeley, CA, USA): *Update on the FERMI@Elettra FEL Commissioning and Initial Operation*.

09/2011 - Invited IPAC (San Sebastian, ES): *Commissioning and Initial Operation of FERMI@Elettra FEL.*

04/2011 - Invited SPIE Conf., Advances in X-ray FELs (Prague, CZ): *FERMI@Elettra, a seeded free electron laser source for a broad scientific user program.*

01/2011 - Invited KVI (Groningen, NL): *The 100 nm to 4 nm Single-pass, Linac-based FERMI@Elettra FEL.*

03/2010 - Invited $2^{nd}$ IRUVX-PP Annual Meeting (Hamburg, D): *FERMI@Elettra is under commissioning*.

09/2009 - Invited ICAP (San Francisco, CA, USA): *Design and Simulation Challenges for the FERMI@Elettra project.*

09/2009 - Invited KIT (Karlsruhe, D): *The 100 nm to 4 nm FERMI@Elettra FEL project*. Introduction to `elegant` for the TBONE project.

10/2008 - Invited 2nd Microbunching Instability Workshop (Berkeley, CA, USA): *Overview and Recent Progress in Theory and Simulation*.

08/2006 - Invited Intern. FEL Conf. (Berlin, D): *How to obtain high quality electron bunches in the presence of normal conducting linac wakefields*.

# Publications

## Peer Reviewed Journals

77. S. Di Mitri, A. Latina, et al. & S. Di Mitri, *Scaling of beam collective effects with bunch charge in the CompactLight free-electron laser*, Photonics (MDPI), **xx** xxxxxx (2020).

76. G. Perosa, et al. & S. Di Mitri, *Linear optics control of sideband instability for improved free-electron laser spectral brightness*, Phys. Rev. Accel. and Beams, **23** 110703 (2020).

75. A. Brynes et al., & S. Di Mitri, *Microbunching instability characterisation via temporally modulated laser pulses*, Phys. Rev. Accel. and Beams, **23** 104401 (2020).

74. S. Di Mitri and G. Perosa, *Electron Beam Transport in PlasmaAcceleratorDriven FreeElectron Lasers in the Presence of Coherent Synchrotron Radiation and Microbunching Instability*, Physics (MDPI), **2** (2020) 521-530.

73. A. Petralia, P. Dattoli, S. Di Mitri, F. Nguyen, *Slice collective dynamics, projected emittance deterioration and Free Electron Laser performance detrimental effects*, J. Plasma Phys., **86(6)**, 845860601 (2020).

72. S. Di Mitri et al., *Experimental evidence of intrabeam scattering in a free-electron laser driver*, New J. Phys., **22**, 083053 (2020).

71. N. Mirian et al., *Spectrotemporal control of soft x-ray laser pulses*, Phys. Rev. Accel. and Beams, **23** 060701 (2020).

70. P. Di Pietro et al., *Terahertz tuning of Dirac plasmons in $Bi_2Se_3$ topological insulator*, Phys. Rev. Letters, **124** 226403 (2020).

69. A. D. Brynes et al. & S. Di Mitri, *Characterisation of microbunching instability with 2D Fourier analysis*, Sci. Rep. **10** 5059 (2020).

68. N. Adhlakha et al., *The TeraFERMI electro-optic sampling set-up for fluence-dependent spectroscopic measurements*, Condens. Matter, MDPI, **5**, 8 (2020).

67. D. You et al., *A detailed investigation of single-photon laser enabled Auger decay in Neon*, New J. Phys., **21**, 113036 (2019).

66. S. Di Mitri et al., *Simple and robust FEL doubler*, Phys. Rev. Accel. and Beams, **22**, 100701 (2019).

65. S. Di Mitri et al., *Laser-slicing at a low-emittance storage ring*, J. Synchr. Rad., **26** (2019).

64. A. Bacci et al., *Two-pass two-way acceleration in a superconducting continuous wave linac to drive low jitter x-ray free electron lasers*, Phys. Rev. Accel. Beams **22**, 111304 (2019).

63. A. Bacci et al., *GeV-class two-fold CW linac driven by an arc-compressor*, Instruments **3**, 54 (2019).

62. L. Serafini et al., *MariX, an advanced MHz-class repetition rate X-ray source for linear regime time-resolved spectroscopy and photon scattering*, Nucl. Instr. and Methods in Phys. Res. A **930** (2019), 167–172.

61. P. Rebernik et al., *Coherent soft x-ray pulses from an echo-enabled harmonic generation free-electron laser*, Nature Photonics, https://doi.org/10.1038/s41566-019-0427-1 (2019).

60. S. Di Mitri et al., *Wakefield benchmarking at a single-pass high brightness electron linac*, Phys. Rev. Accel. and Beams, **22**, 014401 (2019).

59. S. Di Mitri, *One Way Only to Synchrotorn Light Sources Upgrade ?*, J. Synchr. Rad., **25** (2018).

58. S. Di Mitri et al., *Coherent THz Emission Enhanced by Coherent Synchrotron Radiation Instability*, Sci. Reports, **8**, 11661 (2018).

57. A. Brynes et al. & S. Di Mitri, *Beyond the limts of 1D coherent synchrotron radiation*, New J. Phys. **20** (2018) 073035.

56. M. Ferrario et al., *EuPRAXIA@SPARC_LAB Design study towards a compact FEL facility at LNF*, Nucl. Instr. and Methods in Phys. Res. A **909** (2018), 134–138.

55. G. Campogiani et al., *Progress of the development of the ELI-NP GBS high level applications*, Nucl. Instr. and Methods in Phys. Res. A **909** (2018), 327–331.

54. R. K. Lam et al., *Two-photon absorption of soft X-ray free electron laser radiation by graphite near the carbon K-absorption edge*, Chem. Phys. Letters, **703C** (2018) 112–116.

53. R. K. Lam et al., *Soft X-ray Second Harmonic Generation as an Interfacial Probe*, accepted in Phys. Rev. Letters **120** 023901 (2018).

52. S. Di Mitri, S. Spampinati, *Microbunching instability study in a linac-driven free electron laser spreader beam line*, Phys. Rev. Accel. and Beams, **20**, 120701 (2018).

51. G. Penco et al., *Passive Linearization of the Magnetic Bunch Compression Using Self-Induced Fields*, Phys. Rev. Letters **119** 184802 (2017).

50. A. Perucchi et al., *TeraFERMI: a superradiant beamline for THz nonlinear studies at the FERMI free electron laser facility*, Synch. Rad. News **4**, 30 (2017).

49. J. A. G. Akkermans, S. Di Mitri, D. Douglas, I. D. Setija, *Compact compressive arc and beam switchyard for energy recovery linac-driven UV FEL*, Phys. Rev. Accel. Beams **20** 080705 (2017).

48. N. Shafqat, S. Di Mitri, S. Nicastro and C. Serpico, *Design Study of High Gradient, Low Impedance Accelerating Structures for the FERMI Free Electron Laser Linac Upgrade*, Nucl. Instr. and Methods in Phys. Res. A **867** (2017), 78–87

47. E. Roussel et al., *Polarization characterization of soft x ray radiation at FERMI FEL-2*, Photonics (MDPI) **4** 29 (2017).

46. M. Placidi, S. Di Mitri, C. Pellegrini and G. Penn, *Compact FEL-Driven Inverse Compton Scattering Gamma-Ray Source*, Nucl. Instr. and Methods in Phys. Res. A **855** (2017) 55–60.

45. C.-Y. Tsai, S. Di Mitri, D. Douglas, R. Li, and C. Tennant, *Conditions for coherent-synchrotron-radiation-induced microbunching suppression in multibend beam transport or recirculation arcs*, Phys. Rev. Accel. Beams **20** 024401 (2017).

44. T. Takanashi et al., *Time-resolved observation of interatomic Coulombic decay induced by two-photon double excitation of $Ne_2$*, Phys. Rev. Letters **118** 033202 (2017).

43. D. Iablonskyi et al., *Slow Interatomic Coulombic Decay of Multiply Excited Ne Clusters*, Phys. Rev. Letters **117** 276806 (2016).

42. D. Gauthier et al., *Chirped pulse amplification in an extreme-ultraviolet free-electron laser*, Nat. Commun. **7**, 13688 doi: 10.1038/ncomms13688 (2016). (2016).

41. F. Bencivenga et al., *Four-wave-mixing experiments with seeded free electron lasers*, Faraday Discussions, DOI: 10.1039/C6FD00089D (2016).

40. K.C. Prince et al., *Coherent control with a short-wavelength free-electron laser*, Nature Photonics, **13** (2016) 1–5.

39. E. Roussel et al., *Multicolor High Gain Free Electron Laser Driven by Seeded Microbunching Instability*, Phys. Rev. Letters **115** 214801 (2016).

38. S. Di Mitri, *Feasibility study of a periodic arc compressor in the presence of coherent synchrotron radiation*, Nucl. Instr. and Methods in Phys. Res. A **806** (2016) 184–192.

37. S. Di Mitri and M. Cornacchia, *Operating synchrotron light sources with a high gain free electron laser*, New J. Phys. **17** (2015) 113006.

36. S. Di Mitri and M. Cornacchia, *Transverse emittance-preserving arc compressor for high-*

*brightness electron beam-based light sources and colliders*, Europhys. Lett. **109** (2015) 62002.

35. S. Di Mitri, *On the Importance of Electron Beam Brightness in High Gain Free Electron Lasers*, Photonics **2** (2015) 317–341.

34. E. Allaria et al., *The FERMI Free Electron Lasers*, J. Synch. Rad. **22** (2015) 485–491.

33. P. Craievich et al., *Implementation of Radio-Frequency Deflecting Devices for Comprehensive High-Energy Electron Beam Diagnosis*, IEEE Transactions on Nuclear Science, **62**, 1 (2015) 1–11.

32. R. Fiorito et al., *Noninvasive emittance and energy spread monitor using optical synchrotron radiation*, Phys. Rev. Special Topics – Accel. and Beams, **17**, 122803 (2014).

31. S. Spampinati et al., *Laser heater commissioning at an externally seeded free-electron laser*, Phys. Rev. Special Topics – Accel. and Beams, **17**, 120705 (2014).

30. E. Allaria et al., *Control of the Polarization of a Vacuum-Ultraviolet, High-Gain, Free-Electron Laser*, Phys. Rev. X, **4**, 041040 (2014).

29. S. Di Mitri and S. Spampinati, *Estimate of free electron laser gain length in the presence of electron beam collective effects*, Phys. Rev. Special Topics – Accel. and Beams, **17**, 110702 (2014).

28. S. Di Mitri, *Intrabeam scattering in high brightness electron linacs*, Phys. Rev. Special Topics – Accel. and Beams, **17**, 074401 (2014).

27. S. Di Mitri, M. Cornacchia, *Electron Beam Brightness in Linac Drivers for Free Electron Lasers*, Physics Reports **539** (2014) 1–48.

26. S. Di Mitri and S. Spampinati, *Microbunching Instability Suppression with Electron-Magnetic-Phase Mixing*, Phys. Rev. Letters, **112**, 134802 (2014).

25. G. Penco, M. Danailov, A. Demidovich, E. Allaria, G. De Ninno, S. Di Mitri, W.M. Fawley, E. Ferrari, L. Giannessi, and M. Trovo', *Experimental Demonstration of Electron Longitudinal-Phase-Space Linearization by Shaping the Photoinjector Laser Pulse*, Phys. Rev. Letters, **112**, 044801 (2014).

24. E. Allaria, G. De Ninno, S. Di Mitri, W.M. Fawley, E. Ferrari, L. Frhlich, G. Penco, P. Sigalotti, S. Spampinati, C. Spezzani, and M. Trov, *Energy slicing analysis for time-resolved measurement of electron-beam properties*, Phys. Rev. Special Topics – Accel. and Beams, **17**, 010704 (2014).

23. S. Di Mitri. M. Cornacchia, *Merit functions for the linac optics design for colliders and light sources*, Nucl. Instr. and Methods in Phys. Res. A **735** (2014) 60–65.

22. E. Allaria et al., *Two Stage Seeded Soft X-Ray Free-Electron Laser*, Nature Photonics, **7** (2013) 913–918.

21. P. Craievich, S. Di Mitri, M. Milloch, G. Penco, and F. Rossi, *Modeling and experimental study to identify arrival-time jitter sources in the presence of a magnetic chicane*, Phys. Rev. Special Topics – Accel. and Beams, **16**, 090401 (2013).

20. B. Mahieu et al., *Two-colour generation in a chirped seeded free-electron laser: a close look*, Optics Express, Vol. 21 Issue 19 (2013) 22728–22741.

19. E. Allaria et al., *Two-colour pump-probe experiments with a twin-pulse seed extreme ultraviolet free-electron laser*, Nature Communications **4**, 2476 (2013).

18. S. Di Mitri, *Maximum brightness of linac-driven electron beams in the presence of collective effects*, Phys. Rev. Special Topics – Accel. and Beams, **16**, 050701 (2013).

17. S. Di Mitri, D. Castronovo, I. Cudin, and L. Froehlich, *Electron slicing for the generation of tunable femtosecond soft x-ray pulses from a free electron laser and slice diagnostics*, Phys. Rev. Special Topics – Accel. and Beams, **16**, 042801 (2013).

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