

PERSONAL INFORMATION

Lorenzo Mele

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Gender Male | Date of birth 28 October 1992 | Nationality Italian

STUDIES APPLIED FOR

Observational Cosmology

EDUCATION AND TRAINING

2018 – 2021

PhD in Astronomy, Astrophysics and Space Science

“La Sapienza” University of Rome

- Thesis title: “Measurements of Spectral Distortions of the Cosmic Microwave Background: the COSMO experiments”
- Thesis subject: Design and optimization of the blackbody reference calibrator of the COSMO experiment via electromagnetic simulations (Ansys HFSS). Calibration of the instrument and separation of the emission from hot optical elements in the optical chain, as from the cryostat vacuum window, not part of the common-mode signal in the differential Martin-Puplett interferometer. Performance forecast of the COSMO experiment based on Internal Linear Combination (ILC) component separation method, moment expansion of the foregrounds are included in the ILC machinery to mimic the superposition of different Dust populations along a line-of-sight.
- Thesis Advisor: Silvia Masi

2015 – 2017

MD in Astronomy and Astrophysics

“La Sapienza” University of Rome

- Thesis title: “QUBIC: Cryogenics and Polarization Modulation System”
- Thesis subject: Description of the half-wave plate polarization system for the QUBIC experiment, the rotation mechanism which guarantees operation at cryogenic temperatures (4K), the position readout system, the mechanical assembly and tests. Study of systematic effects induced by the precession of the modulating element in a Stokes polarimeter and impact on CMB polarization measurements.
- Thesis Advisor: Silvia Masi
- Thesis Co-Advisor: Giuseppe D’Alessandro
- 110 cum laudae/110

2012 – 2015

BD in Physics and Astrophysics

“La Sapienza” University of Rome

- Thesis title: “Cosmologia Osservativa Dopo I Risultati Di Planck 2013”
- Thesis subject: Description of the standard cosmological model and its simplest parametrization (Λ CDM model) after high resolution observations of the Planck satellite of the relic radiation from the Big Bang.
- Thesis Advisor: Paolo de Bernardis
- 103/110

PERSONAL SKILLS

Mother tongue Italian

Other languages

UNDERSTANDING		SPEAKING		WRITING
Listening	Reading	Spoken interaction	Spoken production	

English	C1	C1	C1	C1	C1
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- Communication skills**
- Team work: I have been working in the Experimental Cosmology Group - G31 in Sapienza University of Rome since the Bachelor's degree, and during the PhD I have also worked in various research teams, collaborating with the G31 group, both national and international: the French group of the QUBIC collaboration and the LSPE and COSMO collaborations with Milan, Genova and Pisa teams.
 - Intercultural skills: I am experienced at working in a European dimension by working in the QUBIC international collaboration.
- Computer skills**
- proficient user of Windows and Linux OS (Ubuntu, Debian)
 - good command of Python, IDL, Zemax Optics-Studio, Ansys HFSS, SolidWorks, Comsol Multiphysics, C, Matlab, Fortran90, Maple, DesignSpark, Arduino, LaTeX and Office Suite
- Certifications**
- British Centre English Certification: C1
- Membership**
- MISTRAL, COSMO, OLIMPO, LSPE, QUBIC and LiteBIRD Collaborations
- References**
- Prof. Paolo de Bernardis, Full professor at *Sapienza University of Rome*, contact: paolo.debernardis@roma1.infn.it
 - Prof. Silvia Masi, Associated professor at *Sapienza University of Rome*, contact: silvia.masi@roma1.infn.it
 - Dr. Giuseppe D'Alessandro, Researcher at *Sapienza University of Rome*, contact: giuseppe.dalessandro@roma1.infn.it

ADDITIONAL INFORMATION

- Publications
- The LSPE Collaboration (2021). *The large scale polarization explorer (LSPE) for CMB measurements: performance forecast*. JCAP: arXiv:2008.11049.
 - Masi S., Battistelli E. S., de Bernardis P., Chapron C., Columbro F., et al. (2021). *QUBIC V: Cryogenic system design and performance*. Accepted in a special issue to JCAP. arXiv:2008.10659.
 - Battistelli E. S., Ade P., Alberro J. G., Almela A., Amico G., et al. (2020). *QUBIC: The Q & U Bolometric Interferometer for Cosmology*. Journal Of Low Temperature Physics ISSN: 0022-2291, doi: 10.1007/s10909-020-02370-0
 - Columbro F., Madonia P. G., Lamagna L., Battistelli E. S., Coppolecchia A., de Bernardis P., Gualtieri R., Masi S., Paiella A., Piacentini F., Presta G., Biasotti M., D'alessandro G., Gatti F., **Mele L.**, Siri B. (2020). *SWIPE multi-mode pixel assembly design and beam pattern measurements at cryogenic temperature*. Journal Of Low Temperature Physics ISSN: 0022-2291, doi: 10.1007/s10909-020-02396-4
 - **Mele L.**, Ade P., Alberro J. G., Almela A., Amico G., et al. (2020). *The QUBIC instrument for CMB polarization measurements*. Journal Of Physics: Conference Series ISSN: 1742-6588, doi: 10.1088/1742-6596/1548/1/012016
 - Marnieros S., Ade P., Alberro J. G., Almela A., Amico G., et al. (2020). *TES Bolometer Arrays for the QUBIC B-Mode CMB Experiment*. Journal Of Low Temperature Physics ISSN: 0022-2291, doi: 10.1007/s10909-019-02304-5
 - Piat M., Belier B., Berge L., Bleurvacq N., Chapron C., et al. (2020). *QUBIC: Using NbSi TESs with a Bolometric Interferometer to Characterize the Polarization of the CMB*. In: LTD18. Journal Of Low Temperature Physics ISSN: 0022-2291, Milano doi: 10.1007/s10909-020-02445-y
 - Mennella A., Ade P., Alberro J. G., Almela A., Amico G., et al. (2019). *QUBIC: Exploring the Primordial Universe with the Q & U Bolometric Interferometer*. Universe vol. 5, ISSN: 2218-1997, doi: 10.3390/universe5020042
 - Coppolecchia A., Paiella A., Lamagna L., Presta G., Battistelli E., de Bernardis P., Castellano M. G., Columbro F., Masi S., **Mele L.**, Pettinari G., Piacentini F. (2019). *W-band Lumped Element Kinetic Inductance Detector Array for Large Ground-Based Telescopes*. Journal Of Low Temperature Physics ISSN: 0022-2291, doi: 10.1007/s10909-019-02275-7
 - D'Alessandro G., **Mele L.**, Columbro F., Pagano L., Piacentini F., de Bernardis P., and Masi S. (2019). *Systematic effects induced by half-wave plate precession into measurements of the cosmic microwave background polarization*. Astronomy & Astrophysics vol. 627, ISSN: 1432-0746, doi: 10.1051/0004-6361/201834495

- Publications**
- May A. J., Chapron C., Coppi G., D'Alessandro G., de Bernardis P., et al. (2018). *Thermal architecture for the QUBIC cryogenic receiver*. In: Proceedings Of The SPIE, The International Society for Optical Engineering. vol. 10708, SPIE ISBN: 9781510619692, usa doi: 10.1117/12.2312085
 - Burke D., Gayer D., Kalinauskaite E., O'Sullivan C., Murphy J. D. et al. (2018). *Optical modelling and analysis of the Q and U Bolometric Interferometer for Cosmology*. In: Proceedings of SPIE - The International Society for Optical Engineering. Proceedings of SPIE vol. 10531, SPIE ISBN: 9781510615472, USA doi: 10.1117/12.2287158
 - O'Sullivan C., Burke D., Gayer D., Murphy J. D., Scully S. et al. (2018). *Simulations and performance of the QUBIC optical beam combiner*. In: Proceedings Of SPIE SPIE - The International Society for Optical Engineering. Proceedings of SPIE vol. 10708, SPIE ISBN: 9781510619692, USA doi: 10.1117/12.2313256
 - O'Sullivan C., Ade P., Alberro J. G., Almela A., Amico G. et al. (2018). *QUBIC: the Q and U bolometric interferometer for cosmology*. In: Proceedings Of SPIE- The International Society for Optical Engineering. Proceedings of SPIE vol. 10708, SPIE ISBN: 9781510619692, USA doi: 10.1117/12.2313332
 - Salatino M., Bélier B., Chapron C., Hoang D. T., Maestre S., et al. (2018). *Performance of NbSi transition-edge sensors readout with a 128 MUX factor for the QUBIC experiment*. In: Proceedings Of SPIE vol. 10708, SPIE ISBN: 9781510619692, usa doi: 10.1117/12.2312080
 - de Bernardis P., Ade P., Amico G., Auguste D., Aumont J., et al. (2018). *QUBIC: measuring CMB polarization from Argentina*. In: Boletín de la Asociación Argentina de Astronomía. vol. 60, p. 107-114, BAAA Malargue; Argentina
 - D'Alessandro G., **Mele L.**, de Bernardis P. Di Tano S., Masi S. (2017). *Polarizing beam-splitter rotation in Martin-Puplett interferometers for spectroscopic measurements at millimeter wavelengths*. Infrared Physics & Technology, vol. 85, p. 92-98, ISSN: 1350-4495, doi: 10.1016/j.infrared.2017.05.015

- Submitted
- Hamilton J.-Ch., Mousset L., Battistelli E.S., Bigot-Sazy M.-A., Chanial P., et al. (2021). *QUBIC I: Overview and Science Program*. Submitted to JCAP. arXiv:2011.02213.
 - Mousset L., Gamboa Lerena M. M., Battistelli E. S., de Bernardis P., Chanial P., et al. (2021). *QUBIC II: Spectro-Polarimetry with Bolometric Interferometry*. Submitted to JCAP. arXiv:2010.15119.
 - Torchinsky S. A., Hamilton J. -Ch., Piat M., Battistelli E. S., Chapron C., et al. (2021). *QUBIC III: Laboratory Characterization*. Submitted to JCAP. arXiv:2008.10056.
 - Piat M., Stankowiak G., Battistelli E. S., de Bernardis P., D' Alessandro G., et al. (2021). *QUBIC IV: Performance of TES Bolometers and Readout Electronics*. Submitted to JCAP. arXiv:2101.06787.
 - D'Alessandro G., **Mele L.**, Columbro F., Amico G., Battistelli E. S., de Bernardis P., et al. (2021). *QUBIC VI: cryogenic half wave plate rotator, design and performances*. Submitted to JCAP. arXiv:2008.10667.
 - Cavaliere F., Mennella A., Zannoni M., Battaglia P., Battistelli E. S., et al. (2021). *QUBIC VII: The feedhorn-switch system of the technological demonstrator*. Submitted to JCAP. arXiv:2008.12721.
 - O'Sullivan C., De Petris M., Amico G., Battistelli E. S., Burke D., et al. (2021). *QUBIC VIII: Optical design and performance*. Submitted to JCAP. arXiv:2008.10119.