BIO-CV Frédéric Zamkotsian, LAM

Dr. Frederic Zamkotsian is a CNRS Research Director at Laboratoire d'Astrophysique de Marseille (LAM, Aix-Marseille University, CNRS, CNES). He received the Ph.D. degree in Physics in 1993 from the University of Marseille (France). Since then, he worked in the field of opto-electronics and semiconductor physics for optical telecommunication in France and in Japan. In 1998, he joined LAM where he developed the conception and the characterization of new Micro-Opto-Electro-Mechanical Systems (MOEMS) as well as innovative MOEMS-based instruments for ground-based and space telescopes. His current interests are in programmable slits for application in multi-object spectroscopy (JWST, European networks, Euclid, BATMAN), deformable mirrors for adaptive optics, and programmable gratings for spectral tailoring. He is the Principal Investigator of BATMAN, a spectro-imager to be installed in 2023 on the 4m-class TNG telescope (French-Italian consortium), and in 2025 on the 8m-class telescope Gemini-South behind the Multi-Conjugate Adaptive Optics system, GeMS. He has initiated several studies in MOEMS, like the project MIRA, a European micro-mirror array, with EPFL and CSEM (Switzerland). He is leading many studies for space agencies (ESA, CNES) on new instrumentation in space for Universe and Earth Observation, as well as European FP7 program and H2020 program (OPTICON) on next generation components like CGH and deformable mirrors, devoted to astronomical instrumentation. He has published over 200 papers and international conference proceedings, as well as 3 book chapters.

He supervised seven PhD students since 2002: A. Liotard (2005) on MOEMS characterization bench development, S. Waldis (2010) and M. Canonica (2012) in collaboration with EPFL (Switzerland) on MIRA design, realization and characterization, D. Nguyen (2017) and N. Trinh Nguyen (2021) in collaboration with FEMTO-ST in Besancon (France) for multi-scale multi-physics MOEMS design software development, R. Alata (2017) on new generation of Computer Generated Hologram using MOEMS-masking techniques, and M. Vachey (2020) on the design of next generation compact spectro-imagers for Universe and Earth Observation.

Carlo Schimd, PhD

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Current position

Oct 2007 - today : *Maître de conférence* at Aix-Marseille Université (AMU).

Education and professional positions

Jan 2008 - Jun 2008	:	temporary assignment CNRS.
Feb 2007	:	qualification Conseil National des Universités – Maître-de-Conférence: section 29 (Physics: Constituants élémentaires) section 34 (Astronomie, astrophysique)
Oct 2005 - Sept 2007	:	post-doctoral fellow at IRFU, CEA Saclay.
Mar 2005 - Oct 2005	:	post-doctoral fellow at *Institut d'Astrophysique de Paris* (IAP).
Mar 2004 - Mar 2005	:	EARA "Marie Curie" post-graduate fellow at IAP.
Jan 2002 - Jan 2005	:	**Ph.D. in Physics**, Department of Physics, University of Parma ◇ *Scalar field cosmologies at low redshift* – supervisor: Prof. S. Matarrese.
Oct 1996 - Jul 2001	:	***Laurea in Fisica* (M.Sc. Degree in Physics)**, University of Padova ◇ Option: Theoretical physics. ◇ Supervisors: Prof. S. Matarrese and Dr. M. Pietroni (INFN).

Scientific activity

◇ **Research interests:**
– *Cosmology: Galaxy clustering:* geometry and topology of cosmic structures, Minkowsky functionals; peculiar velocities, BAO, reconstruction methods, Lagrangian perturbation theory; halo and galaxy bias; dark-matter and dark-energy modelling (massive neutrinos, quintessence, scalar-tensor and $f(R)$ theories, back-reaction).
– *Cosmology: Weak gravitational lensing:* cosmic shear, cluster-counts, galaxy-galaxy lensing, kinematic lensing.
– *Statistics and data analysis:* Bayesian data analysis, Fisher analysis and MCMC, stratified sampling (OA-LH) and Gaussian processes, machine learning.

◇ **Publications:** 38 entries, 1233 citations, h-index 19 (source: NASA Astrophysics Data System, Jan 2021):
- 23 peer review articles (PRL, PRD, A&A, MNRAS, JCAP, ApJ, Science), 5 proceedings, 6 technical proposals;
- outreach: 1 book chapter in *Hybris* (Mimesis, Milano), 3 articles in *Matematicamente* (Mathesis, Verona).

◇ **Memberships:** GAMA, VIPERS, XXL-XMM, Euclid Consortium, VESTIGE, MSE Science Team, SKA France, eLISA Consortium; DEMNUni project.

◇ **Awards:** Marie-Curie postgraduate fellowship EARA (2004), Gini fellowship (2005), Della Riccia fellowship (2005, 2006).

◇ **Grants:** Principal Investigator of: CNRS-INSU project *MorphoLSSisBack* (2014-2016; 10 k€), CNRS-INSU project *Non-linear Cosmic Flows* (2018-2020; 12 k€), Action Incitative AMU 2018-2019 (8.6 k€). CNRS-INSU/AMU/Région PACA/Ville de Marseille grants for LAM workshops (2007-2018, 24.6 k€).

◇ **Referee:**
Physical Review Letters, *Physical Review D*, *Journal of Cosmology and Astroparticle Physics* (JCAP), *General Relativity and Gravitation*, *Physics Letters B*; Croatian Science Foundation, Swiss National Science Foundation.

◇ **Organization of conferences and workshops:**
- Promoter of LAM international workshops: *CosmoTools* (2008), *CosmoClusters* (2009), *CosmoZsurveys* (2010), *CosmoFirstObjects* (2011), *CosmoBias* (2011), *CosmoLens* (2012), *CosmoBack* (2018).
- LOC member of the 10^{th} Marseille Cosmology Conference, *Drifting through the Cosmic Web* (2015).
- SOC-LOC member of *Northern Sky Cosmic Flows* international workshop (LAM, 2018).
- Responsible for LAM GECO-group weakly seminars "Café-club".

Teaching activity – Academic duties – Outreach

Since 2007:	◇ Supervisor of 1 Bachelor student, 14 Master students, co-supervisor of 2 Ph.D. students. ◇ 192 teaching hours/year: *(**2020-2021 classes in boldface**, responsible for classes marked by *)* - *Postgraduate*:† Relativistic cosmology and non-linear clustering* - *Undergraduate*:‡ (1st year) Mécanique newtonienne, Algèbre linéaire, **Laboratoire de physique** (2nd year) Ondes et optique*, **Ondes et signaux***, Interaction rayonnement-matière*, **Project numérique**, Probabilités et statistiques* (3rd year) Mécanique analytique (4th year) Particle physics*, **Numerical Methods, Astrophysics, Statistics and Data Analysis*** (5th year) Spectroscopie astronomique*, Physical cosmology*, **Primordial Cosmology***, Stars and galaxies, Mathematical and statistical methods for physics and astronomy* † *Postgraduate classes at Ecole Doctorale ED 352 (AMU).* ‡ *Undergraduate classes at Licence Physique-Chimie, Licence Mathématiques-Physique-Chimie-Informatique, classe preparatoire Ecole d'Ingegnéur Polytech Marseille, Master Physique (AMU).*
2012 - 2015:	Member of LAM Teaching Committee and representative of LAM at *OCEVU Labex*.
2008:	Member of Ph.D. Committee, CEA Saclay (examinateur).
2020 - today:	Member of the Board of Research of IPhU - Institut Physique de l'Univers (AMU)
2016 - today:	Member of the Board of Directors of OSU Institut Pytheas (AMU).
2008:	Member of recruiting committee for two Associate Professor positions, Université de Provence.
Since 2003:	Several outreach conferences in Italy and France in primary and secondary schools (9-19 years old students) and in public events.
Feb 2019:	Observations at OHP with high-school students (2 nights, T120).

Publication List

1. A. Boselli *et al.*, 2020 *A Virgo Environmental Survey Tracing Ionised Gas Emission (VESTIGE).IX. The effects of ram pressure stripping down to the scale of individual HII regions in the dwarf galaxy IC 3476*, arXiv:2012.07377

2. A. Longobardi *et al.*, 2020, *A Virgo Environmental Survey Tracing Ionised Gas Emission (VESTIGE). VII. Bridging the cluster-ICM-galaxy evolution at small scales*, A&A, 644, 161

3. E. Sarpa, A. Veropalumbo, C. Schimd*et al.*, 2020, *Extended Fast Action Minimisation method: application to SDSS-DR12 Combined Sample*, arXiv:2010.10456

4. A. Boselli et al., 2020, *A Virgo Environmental Survey Tracing Ionised Gas Emission (VESTIGE). VI. Environmental quenching on HII-region scales*, A&A Letter, 634, L1

5. F. Pace, C. Schimd, D. F. Mota, A. Del Popolo, 2019, *Halo collapse: virialization by shear and rotation in dynamical dark-energy models. Effects on weak-lensing peaks*, JCAP, **09**, 60

6. E. Sarpa, C. Schimd, E. Branchini, S. Matarrese, 2019, *BAO reconstruction: a swift numerical action method for massive spectroscopic surveys*, MNRAS, **484**, 3818

7. The MSE Science Team, 2019, *The Detailed Science Case for the Maunakea Spectroscopic Explorer, 2019 edition*, arXiv:1904.04907

8. K. Kraljic *et al.*, 2018, *Galaxy evolution in the metric of the cosmic web*, MNRAS, **474**, 547

9. F. Acero *et al.*, 2017, *French SKA White Book - The French Community towards the Square Kilometre Array*, arXiv:1712.06950

10. M. Pierre *et al.*, 2017, *The XXL survey: First results and future*, Astronomische Nachrichten, **338**, 334

11. A. McConnachie, 2016, *The Detailed Science Case for the Maunakea Spectroscopic Explorer: the Composition and Dynamics of the Faint Universe*, arXiv:1606.00043

12. M. Pierre *et al.*, 2016, *The XXL Survey. I. Scientific motivations - XMM-Newton observing plan - Follow-up observations and simulation programme*, A&A, **592**, 1

13. C. Schimd, H. Courtois, J. Koda, *MSE velocity survey*, SF2A-2015: Proceedings of the Annual meeting of the French Society of Astronomy and Astrophysics (eds.: F. Martins, S. Boissier, V. Buat, L. Cambrsy, P. Petit), 221

14. A. Cappi *et al.*, 2015, *The VIMOS Public Extragalactic Redshift Survey (VIPERS). Hierarchical scaling and biasing*, A&A, **579**, 70

15. D. Micheletti *et al.*, 2014, *The VIMOS Public Extragalactic Redshift Survey. Searching for cosmic voids*, A&A, **570**, 106

16. J. Comparat, E. Jullo, J.-P. Kneib, C. Schimd*et al.*, 2013, *Stochastic bias of color-selected BAO tracers by joint clustering–weak-lensing analysis*, MNRAS, **433**, 1146

17. J. Comparat *et al.*, 2013, *Investigating emission-line galaxy surveys with the Sloan Digital Sky Survey infrastructure*, MNRAS **428**, 1498

18. A. Marchetti *et al.*, 2013, *The VIMOS Public Extragalactic Redshift Survey (VIPERS): spectral classification through principal component analysis*, MNRAS **428**, 1424

19. E. Jullo *et al.*, 2012, COSMOS*: Stochastic bias from measurements of weak lensing and galaxy clustering*, ApJ **750**, 37

20. I. Tereno, C. Schimd, 2012, *Constraints on neutrino masses from CFHTLS cosmic shear*, Proceedings of the XII Marcel Grossmann Meeting on General Relativity – T. Damour, R. T. Jantzen and R. Ruffini eds., Singapore: World Scientific, **2012** 2220

21. D. Clowe *et al.*, 2011, *Photometric Redshifts of Weak Lensing Tomography of Galaxy Clusters*, NOAO Proposal ID 2011B-0241

22. S. Jouvel *et al.*, 2011, *Designing Future Dark Energy Space Missions: II. Photometric Redshift of Space Weak Lensing Optimized Survey*, A&A **532**, 25

23. D. Schlegel *et al.*, 2011, *The BigBOSS Experiment*, arXiv:1106.1706 [astro-ph]

24. D. Clowe *et al.*, 2011, *Photometric Redshifts of Weak Lensing Tomography of Galaxy Clusters*, NOAO Proposal ID 2010B-0318

25. E. Jullo *et al.* 2010, *Cosmological Constraints from Strong Gravitational Lensing in Clusters of Galaxies*, Science, **329**, 924

26. I. Tereno, C. Schimd *et al.*, 2009, CFHTLS *weak-lensing constraints on the neutrino masses*, A&A **500**, 657

27. C. Schimd, 2009, *Dark energy by LSS*, in *Dark Energy and Dark Matter: Observations, Experiments and Theories*, EAS Publications Series, **36**, 33 – E. Pécontal, T. Buchert, Ph. Di Stefano and Y. Copin (eds)

28. C. Schimd, I. Tereno, 2007, *Scalar-field quintessence by cosmic shear: CFHT data analysis and forecasts for DUNE*, Journal of Phys. A: Math.&Theor. **40**, 7105 – Proceeding IRGAC06 (*peer review*), ed. J. Solà

29. A. Vallinotto, S. Dodelson, C. Schimd, J.-P. Uzan 2007, *Weak lensing of baryon acoustic oscillations*, Phys. Rev. D **75**, 103509

30. C. Schimd *et al.*, 2007, *Tracking quintessence by cosmic shear - Constraints from VIRMOS-Descart and CFHTLS and future prospects*, A&A, **463**, 405

31. A. Réfrégier *et al.*, 2006 *DUNE: the Dark Universe Explorer*, Proceedings of SPIE, 6265 – J. C. Mather, H. A. MacEwen & M. W. de Graauw (eds)

32. J. Martin, C. Schimd, J.-P.Uzan, 2006, *Testing for $w < -1$ in the Solar System*, Phys.Rev.Lett., **96**, 061303

33. C. Schimd, J.-P. Uzan, A. Riazuelo, 2005, *Weak-lensing in Scalar-Tensor Theories of Gravity*, Phys. Rev. D, **71** 083512

34. C. Schimd, 2005 *Weak-lensing in Scalar-Tensor Theories of Gravity: Preliminary Results*, Proceedings IAU Symposium No. 225, 129 (2005) – Y. Mellier & G. Meylan eds., Cambridge University Press

35. F. Perrotta, S. Matarrese, M. Pietroni, C. Schimd, 2004, *Non-linear Perturbations in Scalar-Tensor Cosmologies*, Phys. Rev. D **69**, 084004

36. S. Matarrese, M. Pietroni, C. Schimd, 2003, *Non-linear Gravitational Clustering in Scalar Field Cosmologies*, JCAP **08**, 005