



– Two PhD Positions at LAM –

CONCERTO: the promise of a new observational probe of dusty star-formation in post-reionization and reionization epoch

Location:	Laboratoire d'Astrophysique de Marseille (https://www.lam.fr/)
Funding:	ERC CONCERTO (https://mission.lam.fr/concerto/)
Duration:	3 years
Starting date:	Fall 2020
Supervisor :	G. Lagache, with M. Béthermin and A. Beelen
Deadline:	5 Feb 2020
E-mail:	concerto-applications@lam.fr

Applications are invited for two PhD positions on the CONCERTO project at LAM. CONCERTO is a new spectrometer to map in 3-D the intensity due to line emission, a technique known as Intensity Mapping. Capitalizing on a recent technology breakthrough, CONCERTO will measure the 3-D fluctuations of the atomic Carbon [CII] line at redshifts $4.5 < z < 8.5$, a crucial period in star formation history. CONCERTO aims to answer the outstanding questions of whether dusty star-formation contributes to early galaxy evolution, and whether dusty galaxies play an important role in shaping cosmic reionization. It will be installed in January 2021, on the APEX telescope in the Atacama desert in Chile. It will cover the frequency range 120-360 GHz. The dedicated [CII] survey will provide a spatial spectral data cube in which intensity is mapped as a function of sky position and frequency. The 3-D fluctuations are then studied in Fourier space with the power spectrum. Our survey will also be sensitive to CO fluctuations at $z < 2$. While this is a chance for investigating the star formation and gas content of galaxies at lower redshift, it is also a bright foreground signal for [CII], that needs to be removed.

Two PhD positions are available for talented students who are about to finish their Master (or equivalent) degree in Physics or Astrophysics and want to join an original project, based on a novel and extremely promising methodology targeting an unexplored observable linked to some of the fundamental processes building the early Universe.

The first PhD will be dedicated to the [CII] survey. She/He will participate to the commissioning of the instrument, observations in Chile, data reduction and analysis, and interpretation. The second PhD will focus on the cross-correlation between the [CII] (and CO) survey and galaxy surveys (with ancillary data collection needed) with the goal of improving and challenging current models of galaxy formation and evolution.

Positions are funded for 3 years (legal duration for a PhD in France) by the European Research Council (ERC) Advanced Grant. The instruction language is English. The starting date has to be between September 15 and November 15. The LAM provides a stimulating work environment, in a collaborative and collegial atmosphere.

Applications should consist of a cover letter (1 page), a personal statement of research interests indicating why you are interested in pursuing a Ph.D. in observational Cosmology (maximum of 2 pages), a CV (1 page), a list of publications (if applicable), transcripts of the grades of courses obtained during master's degrees, and three letters of recommendation.

Please specify in the cover letter which one the two subjects has your preference. The entire application (but the recommendation letters that can be sent separately) should be submitted electronically, as a single PDF file, to the email address concerto-applications@lam.fr.

Included Benefits:

The successful applicant will be an employee of Protisvalor, a subsidiary of Aix-Marseille University and will receive a comprehensive package of benefits, including an extended health insurance, life insurance, 18 luncheon vouchers per month of 8.50 euros each, and the reimbursement of 50% of public transportation fees.