ASTROPARTICULE ET COSMOLOGIE
UMR 7164 - UNIVERSITÉ PARIS 7 DENIS DIDEROT - CNRS - CEA - OBSERVATOIRE DE PARIS

APC, 10 rue Alice Domon & Léonie Duquet 75205 Paris Cedex 13 - tél. 33 1 57 27 60 70 - fax 33 1 57 27 60 71 - http ://www.apc.univ-paris7.fr

Announcement of a PhD position at Paris Diderot University (Paris, France)

Subject: Ultra-high-energy cosmic ray science with JEM-EUSO

Laboratory: APC (Astroparticle and Cosmology), Paris, France
Adviser: Dr. Prof. Etienne Parizot

Ultra-high-energy cosmic rays (UHECRs) are the most energetic particles known in the universe, with energies of the order of 10^{20} eV. Understanding their global phenomenology and identifying their sources are major research goals in the field of astroparticle physics. The acceleration of particles to such high energies and its link with other astrophysical phenomena are also challenging and open questions for high-energy astrophysics.

As the flux of UHECRs reaching the Earth is extremely low, of the order of one particle per km^2 per millennium, huge experiments have been developed over the last decades, to detect the *extensive air showers* induced by the interaction of UHECRs with the Earth's atmosphere.

JEM-EUSO – the Extreme Universe Space Observatory on-board the JEM module of the International Space Station (ISS) – is an innovative, international effort to open a new road in the detection of UHECRs, designed to reach an unprecedented exposure at the very highest energies. The JEM-EUSO UV telescope should be installed on the ISS to look down to the Earth's atmosphere to detect the fluorescence light emitted by the UHECR air shower.

The APC laboratory is strongly involved in the development of JEM-EUSO space project and serves as the project manager of the pathfinder balloon mission called EUSO-Balloon, whose first flight will take place in 2014 and should be followed by other flights in 2015 and 2016.

The JEM-EUSO and UHECR team at APC (9 researchers and engineers) is known for its important contributions to the field of UHECRs in its various instrumental, phenomenological and theoretical aspects. The successful candidate for the proposed PhD will be associated with the team's activities and be able to work on the photo-detection aspects of JEM-EUSO (precise characterization and calibration of the photo-multiplier tubes), on the simulation of UHECR showers and their detection by JEM-EUSO, on the analysis of the EUSO-Balloon data, and on the acceleration and phenomenology of UHECRs (in relation with the universal cosmic-ray phenomenon). The balance between these various aspects will depend on time, on emerging ideas and research opportunities in the coming years, as well as, of course, on the particular taste, wishes and abilities of the candidate.

The 3-year PhD position is opened at University of Paris Diderot (Paris, *intra muros*), for a start before the end of year 2013. The application must be submitted before September 9th, 2013, in coordination with the host team. To prepare the application, and for any additional information, please contact us at parizot@apc.univ-paris7.fr.

For the UHECR team at APC,

Etienne PARIZOT

Professor at the Paris Diderot University
Head of the High-Energy Astrophysics group
APC, « Astroparticules et Cosmologie »
UMR 7164 / CNRS-IN2P3 / Paris Diderot University
10, rue Alice Domon et Léonie Duquet, 75025 – Paris Cedex 13