

## **PhD position: Development of a wireless communication system for detectors to observe extremely high-energy cosmic rays at the Pierre Auger Observatory in Argentina**

**Job Description:** The search for sources of ultra-high energy cosmic rays (UHECR), their acceleration mechanism, and propagation in the universe are of prime interest for astronomy and astroparticle physics. Currently, the Pierre Auger Observatory investigates the properties of UHECR with a system of fluorescence telescopes and surface detectors, which are installed in the Argentinean Pampa close to the city of Malargüe. The installation of these detectors is completed, but the Observatory is currently complemented by instruments using new detection techniques.

A common property of all new detectors is that they are widespread in the Pampa, work stand-alone (supplied by a solar power) and have to transmit their data by wireless communication to a Central Data Acquisition System (CDAS). Such a communication system is currently under development for the AERA extension, an array of 150 radio detectors spread over 20 km<sup>2</sup>. The radio transceivers are custom made electronics, which transmit the data over up to 10 km and a latency of 3 seconds.

Primary assignment of this position will be the development of the communications hardware, tests and installations on site, and adaptations of FPGA firmware and software to the requirements of other detector types in cooperation with IPE experts. The qualification of the communication system with respect of reliability and packet-loss-rate will require the recording and statistical analysis monitoring data. These are important design criteria for future similar detectors.

**Qualification:** Applicants should hold a qualifying degree in physics, electrical engineering or computer science (Master degree or Diploma). The successful candidate is expected to be self-motivated and enthusiastic about electronics and working in a large, international collaboration. The candidate will have to present and discuss the subject at international conferences and workshops as well as to publish the results in subject-specific journals.

**Salary:** The remuneration is based on *Tarifvertrag des öffentlichen Dienstes* TV-L, E13.

**Institute:** Institute for Experimental Nuclear Physics (IEKP)

**Contract duration:** The position is limited to three years, two years plus one year extension.

**Starting Date:** As soon as possible.

**Application up to:** February 29<sup>th</sup>, 2012 (Review of applications will continue, if the position is not filled after the dead line.)

**Contact person:** Please contact Dr. Matthias Kleifges or Prof. Marc Weber for further information at [Matthias.Kleifges@kit.edu](mailto:Matthias.Kleifges@kit.edu) or [Marc.Weber@kit.edu](mailto:Marc.Weber@kit.edu).

**Application:** Please send your application to:  
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KIT is pursuing a gender equality policy. Women are therefore particularly encouraged to apply. If qualified, handicapped applicants will be preferred.