Vrije Universiteit Brussel

Lectures on Cosmic Rays, 9-10th of April 2015
Vrije Universiteit Brussel

Prof. Dr. Stijn Buitink (Vrije Universiteit Brussel)

# "The origin of cosmic rays"

Cosmic rays are the most energetic particles in the Universe. Their origin is yet unknown despite a century of intensive research with observatories all around the world. Possible sources include the remnants of supernova explosions, the jets of active black holes and gamma-ray bursts. This lecture series will give an overview of the physics of cosmic accelerators and the state-of-the art of cosmic-ray detection.

**Location: Vrije Universiteit Brussel – Campus Oefenplein – "Jean Sacton seminar room" at the IIHE, 1.G.003 (1$^{st}$ level of building G, room 003)**

**Day 1**: **Particle acceleration in the Universe** (9$^{th}$ of April; 10:00-12:00, 13:00-15:00)
Cosmic Rays reach energies up to $10^{20}$ eV. What objects in the Universe can possibly produce such particles? We will explore how particles can be accelerated in the shockwaves surrounding violent cosmic objects. Cosmic rays can provide us with new information about their sources that is complimentary to optical observations. But is this information conserved during the long journey towards the Earth?

**Day 2**: **Detection of cosmic rays** (10$^{th}$ of April; 10:00-12:00, 13:00-15:00)
Cosmic rays are observed with spacecraft, balloons, and vast ground-based arrays. Their flux decreases dramatically towards higher energies, pushing the limits of detector design. We will review different detection techniques used by observatories around the world, from the desolate South Pole to the pampas of Argentina. We will discuss what we have learned from the present generation of experiments and what might be in store for the future.

*For more information please contact Prof. J. D'Hondt (jodhondt@vub.ac.be)*