

The cosmic-ray air shower signal in Askaryan radio detectors

Monday, 4 May 2015 15:45 (15 minutes)

Recently it has been shown that the radio detection technique can be used as a new and complementary detection method for the detection of high-energy cosmic-ray-induced air showers. Along with the detection of the radio emission from air showers, it is shown that the emission can be predicted in great detail establishing the radio emission models. A cosmic-ray air shower hitting a surface, for example an ice-sheet, before it dies out in air will next to the in-air emission also induce a strong transition radiation component. We derived an analytical expression for this coherent transition radiation. This allows us to calculate the radio emission from high-energy cosmic-ray air showers hitting the ice before the shower dies out in air. This signal can be observed by the currently operating Askaryan radio detectors, like e.g. ARA or Arianna, where it is shown that without directional information or surface veto techniques it will be very hard to distinguish the air shower signal from an in-ice neutrino induced particle cascade of similar energy.

Primary author: DE VRIES, Krijn (VUB/IIHE)

Co-authors: VAN EIJNDHOVEN, Nick (VUB/IIHE); AONGUS, O'Murchadha (ULB/IIHE); SCHOLTEN, Olaf (KVI-CART/RUG/VUB/IIHE); BUITINK, Stijn (VUB); MEURES, Thomas (ULB/IIHE)

Presenter: DE VRIES, Krijn (VUB/IIHE)

Session Classification: Cosmic Rays

Track Classification: Cosmic Rays (Theory / Experiment)