



Contribution ID: 13

Type: **not specified**

Radio detection of cosmic ray air showers: The benefits of additional measurements with vertically aligned antennas

Monday 2 June 2014 17:35 (20 minutes)

Nowadays the radio detection technique of air showers is evolving from prototype setups such as the LOFAR Prototype Station (LOPES) to large-scale detector arrays like the Auger Engineering Radio Array (AERA). The detection techniques improved considerably over the last decade. Nevertheless, the contribution of the vertical component to the total radio signal emitted by air showers was not studied experimentally so far. It is expected that the vertical component gets more and more important for horizontal air shower detection.

Most cosmic-ray radio experiments measure with only one or two horizontally aligned antennas at the same location. To study the benefits of additional measurements with vertically aligned antennas we have equipped LOPES with tripole antennas. The additional measurements with vertically aligned antennas are unique which leads to an increase of understanding the radio detection technique. We have developed several approaches exploiting the measurements with vertically aligned antennas and tested them with focus on inclined showers. Unfortunately, these measurements do not have the expected benefits. We investigated that this is mainly due to the high background level at LOPES-3D. For the first time the zenith-angle dependence of the noise background was measured for single components separately. The application of vertical antennas is more promising at radio quiet areas like Argentina which is currently under investigation with first prototype stations co-operating with AERA.

Author: Mr HUBER, Daniel (KIT)

Presenter: Mr HUBER, Daniel (KIT)

Session Classification: Session 2