

# Title of the contribution

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## Abstract

Digital radio-antenna arrays are an alternative instrument for air-shower detection which - compared to air-Cherenkov and air-fluorescences measurements - have the advantage of a very high duty cycle close to 100%. The LOPES experiment is an array of 30 dipole antennas at the Karlsruhe Institute of Technology, Germany. It is triggered by the colocated KASCADE-Grande particle-detector array, and measures cosmic-ray air showers at energies above  $10^{16.5}$  eV. LOPES has shown that a direction precision of better than  $0.65^\circ$  and an energy precision of better than 20% is possible with the radio method. In principle, also the composition of the primary cosmic rays can be reconstructed from the radio measurements. Radio arrays in regions with a lower level of anthropogenic background than in Karlsruhe might even achieve a comparable precision for the composition as air-Cherenkov measurement. Thus, radio measurements of cosmic-ray air showers can be used for multi-messenger studies, or to test models for the cosmic ray origin.