

Results of the ARAcAlTA experiment: measurement of the coherent radio emission from an electron excess in ice.

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The Askaryan Radio Array is a neutrino radio detector array being built at the south pole. It aims at the observation of cosmic ultra high energy neutrino ($E > 10\text{PeV}$) via the coherent radio waves emitted from the charge excess in the cascade induced after the interaction of the neutrinos in ice. The radio signal expected by ARA rely mostly on the simulation of the emission process, the Askaryan radiation, and the detector response. In order to verify both of these aspects, we set up a replica of ARA experiment, ARAcAlTA, using the 40 MeV electron beam of the Electron Light Source facility at Telescope Array site. Electron bunches were shot in a block of ice to produce an electromagnetic shower and the resulting radiation was collected with ARA sensors. Parameters such as coherence, polarization ratio and angular distribution were measured. The difficulty in this experiment comes from the estimation of the possible background such as transition radiation and the radiation from the beam appearance. After describing the experimental setup and the presentation of the main measurements, we will interpret our results in the light of the simulation of the various emission process.

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