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Simulation Study for Radio Measurement of Cosmic Ray Air Showers at the South Pole. EK NARAYAN PAUDEL, Department of Physics and Astronomy, University of Delaware, FRANK SCHROEDER, Bartol Research Institute / Department of Physics and Astronomy, University of Delaware, ICECUBE COLLABORATION — Radio detection of air showers has developed as an effective technique to study very high energy cosmic rays ($\sim$ 100 PeV). We plan to install a surface array of radio antennas and scintillators as an addition to IceTop, a 1 km^2 air shower array at the South Pole. This extension will allow an estimation of the mass composition, energy and arrival direction of very high energy cosmic rays. Two significant components of radio emission from air showers are geomagnetic emission and Askaryan emission. The geomagnetic emission is linearly polarized in the direction of the Lorentz force of the Earth's magnetic field while the less prominent Askaryan emission produced by a net charge excess in the shower front is radially polarized. The combined effect of these two creates an asymmetry in the radio signal. In this talk, we are presenting our study of the relative polarization of these two components at the IceTop location using CORSIKA/CoREAS simulations.

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