

SIMULATION OF THE PROPAGATION OF CR AIR SHOWER CORES IN ICE

Simon De Kockere

simondekockere@gmail.com

COSMIC RAY AIR SHOWERS

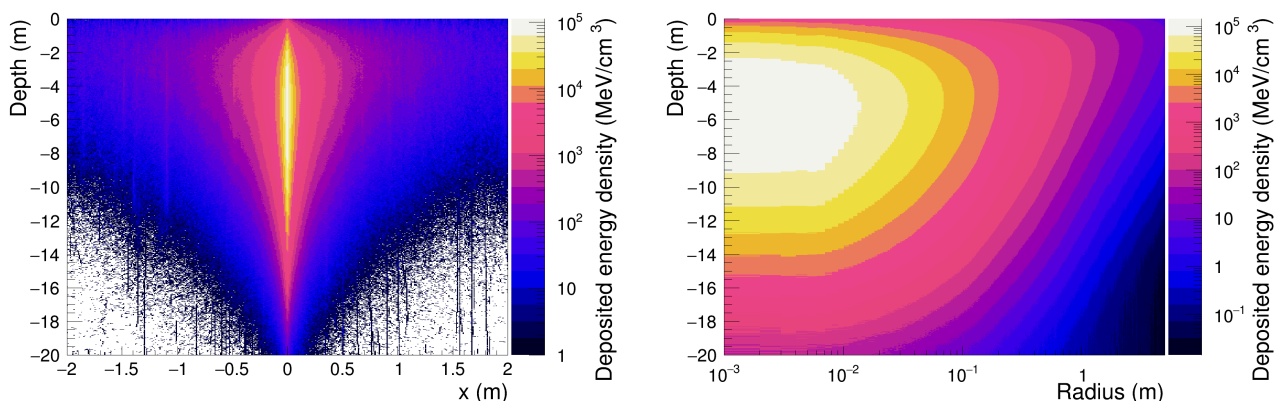
- Have **energy dense core** at typical altitudes of Polar ice sheets
- Will create **Askaryan radio emission** when propagating through ice
- Important **background** and **calibration source** for radio neutrino observatories

SIMULATION METHOD

- Use **CORSIKA** for cosmic ray air shower simulation
- Use **Geant4** to propagate CORSIKA output particles through ice and calculate radio emission

RESULTS

- Number of particles in function of depth not influenced by existence of ice sheet
- **Parameterization** of radial particle distribution in ice in function of X_{max} of the shower and depth in the ice
- Askaryan radio signal **should be detectable**



The deposited energy density in a vertical 1 cm wide slice of the ice going through the center of the particle cascade (*left*) and the deposited energy density in the ice in function of radius and depth (*right*).