

Summary

Giant cosmic ray halos around M31 and the Milky Way

A very extended gamma-ray halo surrounding the galaxy M31 has been detected by Fermi. Explaining the origin of this halo requires to go beyond the standard models for cosmic ray production and transport in galaxies. We investigated hadronic and leptonic scenarios, and showed that both could explain the gamma ray emission. If gamma-ray halos are a common feature of galaxies, including the Milky Way, cosmic ray interactions in the circumgalactic medium could explain both the gamma-ray halo around M31 and the isotropic flux of high-energy neutrinos observed by Icecube.