Investigating the origins of galactic Cosmic Rays with gamma-rays

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Within our Milky Way Galaxy, particles are known to be accelerated to energies beyond the so-called Cosmic Ray knee, a spectral break at ~3 PeV in the all particle cosmic ray spectrum. However, evidence for the associated PeV particle accelerators - PeVatrons - has proven elusive. During recent years, the first astrophysical sources of gamma-rays above 100 TeV have been identified; gamma-rays produced through interactions of particles with PeV energies. Due to particle transport processes, the location of the energetic particles and hence the gamma-ray emission can be offset from the original location of cosmic ray acceleration. In this talk, I will cover recent gamma-ray studies of a several different source classes that are known to accelerate galactic cosmic rays.

In particular, I will highlight some of the still open questions and limitations of our current knowledge. An outlook towards anticipated developments with current and forthcoming facilities will be given.