Gamma-ray astronomy

Cosmic rays (CRs) are thought to be accelerated in our Galaxy at least up to the knee (~ PeV) of the CR spectrum. Since their trajectory is deflected within the Galaxy, gamma rays can be used to probe their acceleration sites and to find which sources are able to accelerate protons up to PeV energies (called PeVatrons). TeV gamma-ray astronomy, thanks in particular to Imaging Atmospheric Cherenkov Telescopes (IACTs), has successfully demonstrated that Galactic sources, such as supernova remnants and pulsar wind nebulae, can efficiently accelerate particles but the nature of the emission (leptonic or hadronic) is under debate in some cases and the inferred maximal energy is usually well below the PeV range. Over the years, the increased number of observations revealed a large diversity of gamma-ray emitting sources and some unidentified PeVatron candidates. Recent results from Extensive Air Shower (EAS) experiments revealed PeV photons towards different types of sources, but the nature and the origin of the emission are still unclear. This talk aims to give an overview of the gamma-ray sky and of the latest observational results from IACTs and EAS experiments in order to summarize where we stand on the search for PeVatrons. The potential outcomes from future observations and experiments will be also presented.