HONEST Workshops: Hot Topics in High Energy Astrophysics



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Supernova remnant/starformation scenarios: why it is necessary to separate the energy requirement for Galactic cosmic rays from the PeVatron requirement

Supernova remnants (SNRs) have long been considered to be the dominant source of Galactic cosmic rays, which was then implied to mean that they provided most of the energy to power cosmic rays as well as that they are capable to accelerate protons up to the cosmic-ray knee. The lack of evidence for PeV cosmic rays inside SNRs, as well as theoretical considerations, has made this scenario untenable. At the same time the latest LHAASO and IACTs results suggest that PeVatrons lurk inside starforming regions. Here I will talk about why SNRs should still be considered the main scenario for the explanation of the energy in Galactic cosmic rays, but show that cosmic-ray data allows for a second component of energies between 10-1000 TeV. This second component could be a subset of supernovae/SNRs, re-acceleration inside star forming regions, or pulsars.

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