

# Cosmic Rays in the Heliosphere

*Monday 26 August 2013 16:30 (24 minutes)*

The heliosphere is populated by a number of different species of energetic particles –galactic cosmic rays, anomalous cosmic rays, solar energetic particles and energetic particles accelerated in the interplanetary medium. The opportunity to study the transport and acceleration of these particles in great detail and, in many cases in situ, from spacecraft enables detailed comparison of theories and observations. Much of this is very relevant to TeV particle astrophysics, as the fundamental processes involved in acceleration and transport are in many cases the same. I will discuss the most-recent issues and insights prompted by observations from heliospheric spacecraft.

Over the past several years, it was found that observations from the Voyager spacecraft in the outer heliosphere were quite different from expectation based on theory and modeling. These have led to much debate concerning the mechanism of transport and acceleration of energetic charged particles. In particular, whether charged-particle acceleration by shocks could account for the particles accelerated in the solar wind and its interaction with the interstellar medium. It has been suggested that acceleration at reconnection events or compressions is more important than shock acceleration. In addition, inner-heliosphere multiple-spacecraft observations have led to discussions of the importance of cross-field transport of cosmic rays.

Finally, Voyager 1 has recently crossed a significant boundary which remains puzzling, but it seems that we now have, for the first time, an unimpeded view of galactic cosmic rays.

**Presenter:** JOKIPII, Jack

**Session Classification:** High-energy cosmic rays and their propagation