

39th COSPAR Scientific Assembly 2012

Research in Astrophysics from Space (E)
Cosmic Ray Origins: the Viktor Hess Centennial Anniversary (E1.15)

X-RAYING HADRONIC ACCELERATION AT THE SN 1006 SHOCK FRONT

Marco Miceli, miceli@astropa.unipa.it
Universita' degli studi di Palermo, INAF-OAPa, Palermo, Italy
Presenting author: **Fabrizio Bocchino**, bocchino@astropa.inaf.it
INAF-Osservatorio Astronomico di Palermo, Palermo, Italy
Anne Decourchelle, anne.decourchelle@cea.fr
CEA Saclay, Gif Sur Yvette, France
Gilles Maurin, gilles.maurin@lapp.in2p3.fr
France
Jacco Vink
Utrecht University, Netherlands
Salvatore Orlando, orlando@astropa.inaf.it
INAF-Osservatorio Astronomico di Palermo, Palermo, Italy
Fabio Reale, reale@astropa.unipa.it
University of Palermo, Palermo, Italy
Jean Ballet, jean.ballet@cea.fr
CEA Saclay, Gif Sur Yvette, France
Sjors Broersen, s.broersen@astro-uu.nl
Netherlands

Shock fronts in young supernova remnants are the best candidates for being sites of cosmic rays acceleration up to a few PeV, though conclusive experimental evidence is still lacking. Theoretical models predict that particle acceleration can modify the post-shock properties, e. g. by increasing the plasma density. We exploited the Large Program of deep XMM-Newton observations of SN 1006 to verify this prediction. We focused on the rim of the supernova remnant and by performing spatially resolved spectral analysis, we found that the shock compression ratio significantly increases in regions where particle acceleration is efficient, in agreement with expectations. Our results provide observational evidence for the presence of hadron acceleration processes at the SN 1006 shock front.