30th International Cosmic Ray Conference

Contribution ID : **614** Type : **Oral**

Theory of cosmic ray production in the supernova remnant RX J1713.7-3946

Saturday, 7 July 2007 09:30 (0:12)

Abstract content

A nonlinear kinetic theory of cosmic ray (CR) acceleration in supernova remnants (SNRs) is employed to investigate the properties of SNR RX J1713.7-3946. Observations of the nonthermal radio and X-ray emission spectra as well as the H.E.S.S. measurements of the very high energy gamma-ray emission are used to constrain the astronomical and the particle acceleration parameters of the system. Under the assumptions that this object was a core collapse supernova (SN) of type II/Ib with a massive progenitor, has an age of about 1600 yr and is at a distance of about 1 kpc, the theory gives indeed a consistent description for all the existing observational data. Specifically it is shown that an efficient production of nuclear CRs, leading to strong shock modification, and a large downstream magnetic field strength B of 100 microG can reproduce in detail the observed synchrotron emission from radio to X-ray frequencies together with the gamma-ray spectral characteristics as observed by the H.E.S.S. telescopes. Small-scale filamentary structures observed in nonthermal X-rays provide empirical confirmation for the field amplification scenario which leads to a strong depression of the inverse Compton and Bremsstrahlung fluxes.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

Proceedings of the 30th International Cosmic Ray Conference; Rogelio Caballero, Juan Carlos D'Olivo, Gustavo Medina-Tanco, Lukas Nellen, Federico A. Sánchez, José F. Valdés-Galicia (eds.); Universidad Nacional Autónoma de México, Mexico City, Mexico, 2008; Vol. 2 (OG part 1), pages 259-262

Primary author(s) : Prof. BEREZHKO, Evgeny G. (Yu.G.Shafer Institute of Cosmocphysical Research and Aeronomy, Yakutsk, Russia); Prof. VOELK, Heinrich J. (Max Planck Institute for Nuclear Physics, Heidelberg, Germany)

Presenter(s) : Prof. VOELK, Heinrich J. (Max Planck Institute for Nuclear Physics, Heidelberg, Germany)

Session Classification : OG 1.4+2.2

Track Classification : OG.1.4