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Primary particle acceleration above 100 TeV in the shell-type Supernova Remnant RX J1713.7–3946 with deep H.E.S.S. observations

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Abstract content

The shell-type supernova remnant RX J1713.7–3946 was observed during three years with the H.E.S.S. Cherenkov telescope system. The first observation campaign in 2003 yielded the first-ever resolved TeV gamma-ray image. Follow-up observations in 2004 and 2005 revealed the very-high-energy gamma-ray morphology of this object with unprecedented precision and enabled spatially resolved spectral studies. Combining the data of three years, we obtain significantly increased statistics and energy coverage of the gamma-ray spectrum as compared to earlier H.E.S.S. results. We present the analysis of the data of different years separately for comparison and demonstrate that the telescope system operates stably over the course of three years. When combining the data sets, a gamma-ray image of RX J1713.7–3946 is obtained with a superb angular resolution of 0.06 degrees. The combined spectrum extends over three orders of magnitude, with significant gamma-ray emission approaching 100 TeV. For realistic scenarios of very-high-energy gamma-ray production, the measured gamma-ray energies imply efficient particle acceleration of primary particles, electrons or protons, to energies exceeding 100 TeV in the shell of RX J1713.7–3946.

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

H.E.S.S. 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 679-682

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