The SNR RX J1713.7−3946: Comparison of keV to TeV data and modelling of the broadband energy spectrum

D. Berge[a], Y. Uchiyama[b] and F. Aharonian[a]

(a) Max-Planck Institut fuer Kernphysik, Postfach 103980, D-69120 Heidelberg, Germany
(b) Yale Center for Astronomy & Astrophysics, Physics Department, P.O. Box 208121, New Haven, Connecticut
Presenter: D. Berge (berge@mpi-hd.mpg.de), ger-berge-D-abs2-og22-poster

The shell-type supernova remnant (SNR) RX J1713.7−3946 (G347.3−0.5) has been discovered in the ROSAT all-sky survey. It is one of the brightest Galactic X-ray SNRs and exhibits a typical shell morphology, but remarkably the X-ray spectrum is completely dominated by a non-thermal continuum without detectable line emission. Recent CO measurements suggest that the supernova blast wave is expanding at least on the western side into dense molecular clouds which makes this source an ideal site for the production of very-high-energy gamma rays by inelastic interactions of high-energy protons with matter. TeV emission was indeed confirmed in 2003 with the H.E.S.S. telescopes which were able to actually resolve for the first time ever high-energy gamma-ray emission from the shell of RX J1713.7−3946.

Follow-up observations have been performed with H.E.S.S. in 2004 which greatly increased the available event statistics (see separate conference contribution). The excellent quality of the data allows us to compare in detail for the first time X-ray and gamma-ray data of a shell-type SNR. At the conference, we will present elaborate comparisons of ASCA and XMM data to the H.E.S.S. data set and discuss possible implications. Furthermore, broadband modelling of the energy spectrum will be shown. Electronic and hadronic processes are considered to explore the possible emission mechanisms of the very-high-energy gamma rays.