Contribution ID: **63**   Type: **Contributed Talk**

X and gamma ray correlations in the SNR RX J1713.7-3946

Monday 10 October 2022 16:00 (15 minutes)

RX J1713.7-3946 is the brightest TeV supernova remnant, so it is an important test case for cosmic-ray acceleration. The mainstream view is that the SNR developed into the tenuous wind of its high-mass progenitor and now reaches a shell of denser gas around. The gamma rays are well correlated with the X-rays (synchrotron), but the correlation is very non linear (approximately Fgamma as Sqrt(FX)). The most natural model (Acero et al 2009, A&A 505, 157) is that gamma rays are dominated by inverse Compton emission (leptonic).

We have obtained deep full coverage of RX J1713.7-3946 with XMM-Newton (PI F. Acero), increasing the exposure by a factor of up to 8 and revealing faint structures in an unprecedented way. Together with the good TeV map (HESS collaboration et al 2018, A&A 612, A6), it allows testing the gamma/X correlation into the faint areas. The HESS collaboration reported gamma-ray emission beyond the X-ray border in the southwest, which could be due to escape of cosmic-ray protons. We revisit these radial profiles taking into account the absorption effect in the X-rays and the gamma/X correlation. We also find a nice example of clump/shock interaction.

Track

SNR/PWNe

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Session Classification: Parallel 2