Contribution ID: **490** Type: **Contributed e-poster**

Pursuing the Origin of the Gamma Rays in RX J1713.7-3946 Quantifying the Hadronic and Leptonic Components

We analyzed the TeV gamma-ray image of a supernova remnant RX J1713.7-3946 (RX J1713) through a comparison with the interstellar medium (ISM) and nonthermal X-rays. The gamma-ray data sets at two energy bands of >2 TeV and >250-300 GeV were obtained with H.E.S.S. and utilized in the analysis. We employed a new methodology, which assumes that the gamma-ray counts can be expressed as a linear combination of two terms: one is proportional to the ISM column density and the other proportional to the X-ray count. We then assume that these represent the hadronic and leptonic components, respectively. By fitting the expression to the data pixels, we find that the gamma-ray counts are well represented by a flat plane in the 3D space formed by the gamma-ray counts, the ISM column density, and the X-ray counts. The results using the latest H.E.S.S. data at $4.8'$ resolution show that the hadronic and leptonic components constitute (67 ± 8)% and (33 ± 8)% of the total gamma rays, respectively, where the two components have been quantified for the first time. The hadronic component is greater than the leptonic component, which reflects the massive ISM of $\sim 10^4\ M_\odot$ associated with the remnant, lending support for the acceleration of cosmic-ray protons. There is a marginal hint that the gamma rays are suppressed at high gamma-ray counts, which may be ascribed to second-order effects including the shock-cloud interaction and the effect of penetration depth.

Primary authors: Prof. FUKUI, Yasuo (Nagoya University); Dr SANO, Hidetoshi (Gifu University)

Co-authors: Dr YAMANE, Yumiko (Nagoya University); Dr HAYAKAWA, Takahiro (Nagoya University); Prof. INOUE, Tsuyoshi (Konan University); Prof. TACHIHARA, Kengo (Nagoya University); Prof. ROWELL, Gavin (The University of Adelaide); Dr EINECKE, Sabrina (The University of Adelaide)

Presenter: Prof. FUKUI, Yasuo (Nagoya University)

Session Classification: Contributed posters