Contribution ID: **293** Type: **Oral Presentation**

Particle Acceleration at Reflected Shocks in Supernovae Remnants

Thursday, 7 July 2022 15:30 (15 minutes)

Supernovae remnants (SNRs) are believed to be one of the prime sources of high-energy cosmic rays within our galaxy. SNRs are known to be efficient particle accelerators. Protons and electrons can be accelerated to very high energies of at least several tens of TeV both at the front and at the reverse shock of the remnant. These accelerated particles subsequently produce non-thermal emissions across the whole electromagnetic spectrum from radio to very-high-energy gamma-rays, which can be observed by current instruments. The mechanism for this acceleration is believed to be diffusive shock acceleration, which produces non-thermal particles with a power-law distribution in energy.

Core-collapse SNRs are expected to expand into a complex environment of the stellar wind bubble blown up by their progenitor stars, where forward shock might interact with various density inhomogeneities. Such interaction would cause the formation of reflected shocks propagating inside the remnant which can potentially be strong enough to also accelerate particles. Investigations of particle acceleration in SNRs presented in the literature are usually limited to forward and reverse shocks ignoring the complexity of the hydrodynamic picture. Although for most SNRs the observed shell-like morphology generally agrees with an idea that high energy particles originate predominantly from the forward shock (for some remnants the significant contribution from the reverse shock was also confirmed (Brose et al. 2019), precise spatially resolved measurements do not always agree with a simplified picture giving rise to alternative ideas such as interaction with dense cloudlets (see e.g. Sushch & Hnatyk, 2014). This review would be focused on the investigation of particle acceleration at the reflected shocks formed through the interaction of the forward shock with density inhomogeneities and its potential impact on the overall observational properties.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

MSc

Primary author: LE ROUX, Jacobus Frederik (North West University)

Presenter: LE ROUX, Jacobus Frederik (North West University)

Session Classification: Astrophysics

Track Classification: Track D1 - Astrophysics