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# Investigating the CREDIT history of supernova remnants as cosmic-ray sources

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Supernova remnants (SNRs) have long been suspected to be the primary sources of Galactic cosmic rays. Over the past decades, great strides have been made in the modelling of particle acceleration, magnetic field amplification, and escape from SNRs. Yet, while many SNRs have been observed in non-thermal emission in radio, X-rays, and gamma-rays, there is no evidence for any individual object contributing to the locally observed flux. Here, we propose a particular spectral signature from individual remnants that is due to the energy-dependent escape from SNRs. For young and nearby sources, we predict fluxes enhanced by tens of percent in narrow rigidity intervals; given the percent-level flux uncertainties of contemporary cosmic-ray data, such features should be readily detectable. We model the spatial and temporal distribution of sources and the resulting distribution of fluxes with a Monte Carlo approach. The decision tree that we have trained on simulated data is able to discriminate with very high significance between the null hypothesis of a smooth distribution of sources and the scenario with a stochastic distribution of individual sources. We suggest that this cosmic-ray energy-dependent injection time (CREDIT) scenario be considered in experimental searches to identify individual SNRs as cosmic-ray sources.

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