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On the connection of gamma rays from supernova remnants interacting with molecular clouds and cosmic ray ionization measured in the mm range

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Cosmic rays are an essential ingredient in the evolution of the interstellar medium, as they determine the ionisation level of the dense molecular gas where stars and planets form. In recent years, infrared and millimetre observations provided us with measurements of the cosmic ray ionisation rates in a number of molecular clouds. Such ionisation is mainly determined by cosmic rays in the MeV domain. Remarkably, in a handful of cases the clouds interact with supernova remnant shocks, and have also been detected in GeV and TeV gamma rays. The combination of these high and low-energy measurements will allow us to extract the spectrum of cosmic rays produced at the supernova remnant over an unprecedented energy range (more than six orders of magnitude!). This will constitute a crucial step towards the solution of the problem of the origin of cosmic rays.

Collaboration

– not specified –

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