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Gamma-Rays Produced in Cosmic-Ray Interactions and the TeV-band Spectrum of RX J1713-3946[1] MARTIN POHL, CHING-YUAN HUANG, SONG-EUI PARK, CHRIS DANIELS, Iowa State University — We study the individual contribution to diffuse γ-ray emission from the secondary products in hadronic interactions generated by cosmic rays (CRs), in addition to the contribution of π^0 decay. For that purpose we employ the Monte Carlo particle collision code DPMJET3.04 to determine the multiplicity spectra of various secondary particles with γ's as the final decay state, that result from inelastic collisions between cosmic-ray protons and Helium nuclei and the interstellar medium with standard composition. We thus derive an easy-to-use γ-ray production matrix for cosmic ray with energies up to about 10 PeV. The production matrices are used to interpret the γ-ray spectra of diffuse galactic emission and supernova remnants (SNR) and also to the GeV excess in diffuse galactic γ-rays. We also test the hypothesis that the TeV-band γ-ray emission of the shell-type SNR RX J1713-3946 observed with HESS is caused by shock-accelerated hadronic cosmic rays. Using the χ^2 statistics we find that a continuously softening spectrum is strongly preferred, in contrast to expectations. A hardening spectrum has about 1% probability to explain the HESS data, but then only if a hard cut-off at 50-100 TeV is imposed on the particle spectrum.

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