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A Radiation Transfer Model for the UV-submm Radiation Fields in the Milky Way: Application to High Energy Astrophysics

Friday 31 July 2015 11:00 (15 minutes)

We present a solution for the interstellar radiation fields (ISRF) in the Milky Way from UV to submm wavelengths based on axisymmetric radiation transfer modelling of the panchromatic SED of the galaxy in direct and dust-reradiated starlight as constrained by all-sky imaging by the IRAS, COBE and Planck satellites. This is the first self-consistent model of the spatial and spectral distribution of radiation fields that predicts all available observations, including the submm imaging from Planck. For canonical electron energy spectra we predict the relative levels and hardness of inverse compton (IC) emission from the ISRF and cosmic microwave background as a function of position in the galaxy. The ISRF component is found to become important within the solar circle not only for high energy IC emission from the diffuse interstellar medium, but also for very high energy IC emission from sources of cosmic ray electrons, notwithstanding the diminution of the ISRF component through the Klein-Nishina effect. We also predict the variation over the sky in visibility of very high energy gamma-ray sources within and external to the galaxy due to pair production in the mid-IR component of the ISRF.

Collaboration

– not specified –

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