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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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