

Natural model for the Fermi bubbles and Galactic haze

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We show that the Fermi Bubbles and the Galactic haze are naturally interpreted as inverse-Compton and synchrotron emission from the same spectrum of cooling cosmic ray electrons. This avoids the ad-hoc spectral features and superfluous acceleration mechanisms typically assumed. The model implies that the bubbles originated 2-3 Myr ago, the mean magnetic field in the haze region is $\sim 3 \mu\text{G}$, and the radiation field in the bubble is dominated by starlight with mean energy density $> 2 \text{ eV}/\text{cm}^3$. These parameters imply that the bubbles accelerate cosmic ray protons (iron nuclei) up to energies of $\sim 5 \cdot 10^{17} \text{ eV}$ ($\sim 10^{19} \text{ eV}$).

In contrast, a hadronic model fails to naturally account for the gamma-ray spectrum of the bubbles, in particular once the haze-emitting electrons are taken into account.

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