

Stochastic Acceleration by Turbulence in the Fermi Bubbles

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The discovery of the Fermi bubbles - a huge bi-lobular structure seen in GeV gamma-rays above and below the Galactic center - implies the presence of a large reservoir of cosmic rays up to ~ 10 kpc from the disk. Diffuse shock acceleration, which is at work in known sources of cosmic rays, cannot explain the cosmic rays in the bubbles since there is no evidence for the presence of a strong shock. Furthermore, multi-wavelength observations point towards electrons producing the emission by inverse Compton scattering. We have investigated the time-dependent acceleration of electrons and protons in a numerical model including the relevant transport and energy loss processes and will discuss the challenges in satisfying all spectral and morphological features of the bubbles.

Summary

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