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## Fermi gamma-ray ‘bubbles’ from stochastic acceleration of electrons

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Gamma-ray data from Fermi-LAT reveal a bi-lobular structure extending up to 50 degrees above and below the galactic centre, which presumably originated in some form of energy release there less than a few million years ago. It has been argued that the gamma-rays arise from hadronic interactions of high energy cosmic rays which are advected out by a strong wind, or from inverse-Compton scattering of relativistic electrons accelerated at plasma shocks present in the bubbles. We explore the alternative possibility that the relativistic electrons are undergoing stochastic 2nd-order Fermi acceleration by plasma wave turbulence through the entire volume of the bubbles. The observed gamma-ray spectral shape is then explained naturally by the resulting hard electron spectrum and inverse Compton losses. Rather than a constant volume emissivity as in other models, we predict a nearly constant surface brightness, and reproduce the observed sharp edges of the bubbles.

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