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Diffusing assumptions in astroparticle physics

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Previous calculations of diffuse radio emissions from dark matter annihilations have made use of Green's function approximations to solve the diffusive cosmic ray transport equation. Some notable astrophysical code packages, including GALPROP and DRAGON, take a numerical approach to this calculation that involves the use of the Crank-Nicolson finite-differencing scheme. In this work we analyse the physical accuracy of the analytic approximations and directly compare the computational efficiency of the two solution methods. We also incorporate full spatial dependence into the diffusion and energy-loss coefficients, and compare this to the approach of using spatially-averaged values of the magnetic field strength and thermal electron population.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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