

Abstract Submitted
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Numerical Methods for Modeling Cosmic Ray Propagation in the Galaxy HUGO ESPEJEL, University of Texas at San Antonio, EDMUND BERTSCHINGER¹, Massachusetts Institute of Technology — This work seeks to investigate the trajectories of cosmic ray (CR) particles traveling from a source, like a pulsar or supernova, to Earth. Galactic CRs of moderate energy travel in tightly wound helices around the Galactic magnetic field lines. To better understand how this propagation is affected by errors from numerical integration, a model of the trajectory of a simple harmonic oscillator (SHO) in 2-dimensional phase space is calculated using three algorithms (Euler, Euler-Cromer, and Leapfrog methods). The errors associated with these algorithms are explained using techniques of numerical analysis. Results show that the Leapfrog method converges to the analytic solution of the equations of motion of the SHO the fastest. This method will be used to calculate the trajectory of the Galactic CRs.

¹Principal Investigator

Hugo Espejel
University of Texas at San Antonio

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