

Abstract Submitted
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Relation of Electron Scattering Cross-Sections to Drift Measurements in Noble Gases BLAKE STACEY, MIT — I investigate the classic “inverse problem” of extracting collision and scattering cross sections from measurements of electron swarm behavior. A Monte Carlo technique for simulating electron motion through a gas of isotropic scatterers is presented, providing a simplified version of Biagi’s MAGBOLTZ algorithm. Using this Monte Carlo software, I examine the thermalization of electron swarms, focusing on their drift velocity and Shannon entropy, providing justification for a set of analytic expressions for drift measurements which are valid in the hydrodynamic regime. These expressions are then used to estimate the scattering cross section, first by a simple grid interpolation and then through a genetic algorithm (GA). This technique demonstrates that the He-4 momentum-transfer cross section in the 0-7 eV range is approximately 6.5 \AA^2 , with a peak near 2 eV, in agreement with literature values.

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