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A Comprehensive Monte Carlo Simulation Tool on Electron Transport in Noble Gases and Liquids

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Understanding electron transport dynamics in noble gases (He, Ne, Ar, Kr, Xe) and their liquid phases (Ar, Kr, Xe) is critical for optimizing particle detector performance. We report the development of a MC tool for electron transport through electron-atom collisions, including elastic scattering, excitation and ionization. n coefficient. For the liquid-phase system, two models are discussed. The simulation framework is validated by analyzing electron swarm parameters—specifically drift velocity and diffusion. The results confirm the tool's effectiveness in predicting transport properties, offering a versatile platform for detector design optimization.

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