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Collision chemistry impact on Townsend's avalanche development

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This scientific article explores the impact of collision chemistry on Townsend's avalanche development through an innovative computational approach. By combining the Particle- in-Cell (PIC) algorithm and Monte Carlo (MCC) collisions, we determine the first Townsend coefficient for Helium gas. Further, we investigate the influence of a variable number of collisions in our simulations to achieve accurate compliance with experimental results. A distinctive aspect of this work involves the use of a custom-built meta-programming library in the Julia programming language, enabling automatic code generation for enhanced efficiency and reproducibility.

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