Monte Carlo Scattering Corrections to Moments-Based Emission Models

Kevin Jensen*, Joan Yater, John Shaw, Brad Pate, Eric Montgomery**, Donald Feldman, Patrick O'Shea, John Petillo

*Lead author
**Presenter

Abstract: Existing moments-based photo and secondary emission models for particle-in-cell codes have the advantage of fast execution but have made use of the approximation that one scattering event is fatal to emission. This assumption is good for metals where large emission barriers and electron-electron scattering dominate, but poor for semiconductors and emission barriers small compared to the electron energy. The scattering operators are here revised with Monte Carlo corrections for multiple scattering events while improving speed and accuracy. A "universal" correction factor to the Moments approach is identified so that a Monte Carlo calculation need not be made on the fly. Time response is analytically characterized by a new shell-sphere model. Effect on quantum efficiency and temperature dependencies are addressed.