

An introductory treatment of the physics of electron emission is given, starting with a pedagogical account of the canonical equations of thermal, field, photo, and secondary emission and their evaluation. THEORY will focus on developing the foundations of the one-dimensional emission equations using methods from statistical physics, solid state physics, and quantum mechanics, then extending them to develop a general thermal-field-photoemission theoretical model. Computational methods are emphasized for emission topics including (as space permits) evaluating tunneling, resonance, transmission, tunneling time, emission current and multidimensional emission models. SIMULATION will focus on factors affecting use of the emission equations including (as space permits) emission non-uniformity and surface / chemical roughness, emittance and beam physics, models of field enhancement factors and shielding effects, thermal-field effects from cones and wires, the intersection of the emission equations with space charge limited emission, the optical properties of materials and their relationship to photoemission yield, and the relation of scattering effects to photo and secondary yield.