

Abstract Submitted
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Unified Theory of Field Emission and Thermionic Emission¹ HEE-TAE KIM, ISAAC SILVERA, Lyman Laboratory of Physics, Harvard University, Cambridge, MA 02138 — There are two well-known kinds of electron emissions from metal surfaces: field emission and thermionic emission. For thermionic emission electrons are emitted when they have sufficient thermal energy to overcome the work function and for field emission, as Fowler-Nordheim tunneling, they are emitted by tunneling, aided by a strong repulsive electric field. We considered the most general case of both processes together, using a free electron gas model. This can be important in the case of a field emission current ohmically heating the emission tip. The total emission current density is compared to field emission for different temperatures and to thermionic emission for different electric fields.

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