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Angle-resolved spatial and compositional variations in pulsedelectron-beam deposited thin films¹ ANDREW STEIGERWALD, RICHARD MU², Fisk University — Pulsed electron deposition (PED) is a novel thin film growth technique that utilizes short, high-energy electron pulses to ablate material at a target surface. We report experimental evidence of angular dependent variations in particle-flux and composition within the ablated plume. These results are discussed within the framework of a model for a similar technique, pulsed laser deposition. Film thickness profiles are fitted to $Cos(\theta)^p$ and $A \cdot (1 + k^2 \cdot Tan(\theta)^2)^{-(3/2)}$ curves, representing effusive source models and an adiabatic expansion model, respectively. Similarities between the PED and PLD processes are highlighted. Understanding plume dynamics and its consequences on local film structure will lead to higher quality films, increased innovation in deposition techniques, and advancement of PED as a promising candidate for industrial thin film growth.

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