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Modeling the Transport of Colloids to Electrode Strips During Electrophoretic Deposition[1] ANDREW PASCALL, KYLE SULLIVAN, JOSHUA KUNTZ, Lawrence Livermore National Laboratory — Electrophoretic deposition (EPD) is an industrially relevant process in which colloidal particles suspended in a liquid are forced to deposit on a electrode under an applied electric field. Studies of the formation of deposits by EPD have generally focused on electrode geometries that yield analytical solutions, such as infinite parallel planes and concentric cylinders. Here, we focus on an experimentally relevant geometry that has not yielded analytical solutions—the planar strip electrode. We present a finite element model for the transport of material onto a planar strip electrode which shows excellent qualitative agreement to experimental results in a similar system. Notably, we demonstrate that the presence of the edges of the electrode lead to a singularity in the electric field that significantly effects the morphology of the deposit at short times or for thin deposits.

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