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Benchmarking a 3D Map-Based Approach to Modeling Beam Transport in RF Cavities¹ ILYA POGORELOV, DAN ABELL, PETER STOLTZ, Tech-X Corporation, JIM AMUNDSON, Fermi National Accelerator Laboratory — We present results of benchmarking our recently developed capability for generating High-Order Mode (HOM) maps of RF cavity fields for use in particle tracking code-based simulations. We use VORPAL field data as a starting point, and follow the approach of Abell to produce transfer maps that are subsequently incorporated into the MaryLie/IMPACT (ML/I) and Synergia frameworks. For the $m = 0$ mode, we conducted detailed comparisons between map-based ML/I simulations of on- and off-axis beam transport through a realistic RF cavity on one hand, and the results of a direct 3D EM VORPAL simulation on the other. We present and discuss these benchmarking results.

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