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**Efficient outcoupling of terahertz radiation from relativistic beam driven dielectric lined waveguides** MONIKA YADAV, UCLA and University of Liverpool, WALTER LYNN, NATHAN MAJERNIK, GERARD ANDONIAN, OLIVER WILLIAMS, BRIAN NARANJO, UCLA, CARSTEN WELSCH, University of Liverpool and Cockroft institute, JAMES ROSENZWEIG, UCLA — Wakefields in dielectric structures are a useful tool for beam diagnostics and manipulation with applications including acceleration, shaping, chirping, and THz radiation generation. Simulations have been conducted using CST Studio for a 10 GeV beam (with FACET-II parameters) in a slab-symmetric, dielectric waveguide. Various termination geometries were studied to effectively out-couple the THz radiation including flat cuts, metal horns, and the "Vlasov antenna". Simulations indicate that the Vlasov antenna geometry is optimal and detailed studies were conducted on a variety of dielectrics including quartz, diamond, and silicon. Multiple modes were excited and coherent Cherenkov radiation (CCR) was computationally generated for both symmetric and asymmetric beams. This study is important to achieve efficient outcoupling of terahertz radiation. Finally, we include witness beams to study transport and acceleration dynamics as well as the achievable field gradients.

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