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Interaction of High Frequency Electromagnetic Waves with Vortex Density Structures: Comparison of Analytical and LSP Simulation Results[1] V. SOTNIKOV, T. KIM, Air Force Research Laboratory, Wright Patterson AFB, OH 45433, J. LUNDBERG, Riverside Research, Beavercreek, OH 45431, I. PARASCHIV, University of Nevada at Reno, NV 89523, T.A. MEHLHORN, Naval Research Laboratory, Washington, DC 20375 — Interchange or flute type density irregularities in magnetized plasma are associated with Rayleigh-Taylor type instability. In particular, we are interested in the generation of low frequency plasma density irregularities in the form of flute type vortex density structures and interaction of high frequency electromagnetic waves used for surveillance and communication with such structures. These types of density irregularities play an important role in refraction and scattering of high frequency electromagnetic signals propagating in the earth ionosphere, in high energy density physics (HEDP), and in many other applications. We will present PIC simulation results of EM scattering on vortex type density structures using the LSP code and compare them with analytical results. Two cases will be analyzed. In the first case electromagnetic wave scattering will take place in the ionospheric plasma. In the second case laser probing in a high-beta Z-pinch plasma will be presented.

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