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Whistlers in Inhomogeneous Plasmas¹ ANATOLY STRELTSOV, Icarus Research, MARTIN LAMPE, NRL, WALLACE MANHEIMER, Icarus Research, GURU GANGULY, NRL, GLENN JOYCE, George Mason University — This paper examines ducting of whistlers in density channels perpendicular to an ambient magnetic field, focusing on the case where the transverse scale-sizes of the ducts are comparable to the perpendicular wavelength. Here analysis of the whistler ducting problem based on the geometrical optics becomes invalid, and numerical simulations of the full wave model should be done. Numerical model used in this study is based on the quasi-longitudinal, electron MHD model. Simulations confirms some of the classical results related to the guiding of the whistler waves by the density channels and also reveals some new effects. In particular, our results demonstrates that whistlers can be trapped not only in symmetrical density channels but also on a single transverse gradients in the background density, which is an important finding in the application to the magnetosphere. Also for high density ducts, we find that the wave energy can leak out due to coupling to modes propagating outside the duct.

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