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Autoresonant backward Raman scattering in inhomogeneous plasmas ODED YAAKOBI, LAZAR FRIEDLAND, Racah Institute of Physics, The Hebrew University, Jerusalem, Israel, RYAN LINDBERG, ANDREW CHARMAN, Department of Physics, University of California, Berkeley, California, USA, GREGORY PENN, Center for Beam Physics, Lawrence Berkeley National Laboratory, Berkeley, California, USA, JONATHAN WURTELE, Department of Physics, University of California, Berkeley, California, USA — New solutions to the coupled three-wave equations in a nonuniform plasma medium are presented that include both space and time dependence of the waves. By including the dominant nonlinear frequency shift of the material wave, it is shown that if the driving waves are sufficiently strong (in relation to the medium gradient), a nonlinearly phase-locked solution develops that is characteristic of autoresonance. In this case, the material (electrostatic) wave develops into a front starting at the linear resonance point and moving with the wave group velocity in a manner such that the intensity increases linearly with the propagation distance. The forms of the other two (electromagnetic) waves follow naturally from the Manley-Rowe relations.

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