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Trapping of Intense Electromagnetic Waves in Relativistic Electron Holes BENGT ELIASSON, PADMA KANT SHUKLA, Ruhr-University Bochum — We consider the nonlinear interactions between intense localized electromagnetic waves (EMWs) and a relativistically hot electron plasma that supports relativistic electron holes (REHs). Such EMW-REH interactions are governed by a coupled nonlinear system of equations composed of the Maxwell equation describing the dynamics of the EMWs and the Poisson-relativistic Vlasov system describing the dynamics of driven REHs. The present nonlinear system of equations admits both linearly trapped discrete number of eigenmodes of the EMWs in a quasi-stationary REH, and a modification of the REH by large-amplitude trapped MWs. The properties of EMS-REH solitary waves are compared with the ones of relativistic solitary waves in cold plasmas. Computer simulations of the relativistic Vlasov and Maxwell-Poisson system of equations show complex interactions between REHs loaded with localized EMWs.

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