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Ryan G Halabi and **John K Hunter*** (jkhunter@ucdavis.edu), Department of Mathematics, University of California at Davis, Davis, CA 95616. *Nonlinear Surface Plasmons*.

Surface plasmons (SPs) are electromagnetic surface waves that propagate on an interface between a conductor and an insulator and decay exponentially away from the interface. In the high-wavenumber limit, SPs are quasi-static with constant linearized frequency, which results in complicated spatially nonlocal, nonlinear dynamics. We derive asymptotic equations for weakly nonlinear, quasi-static SPs on a planar interface between isotropic materials with a cubic Kerr nonlinearity. The asymptotic equations are Hamiltonian and couple the projections of the electric field on the interface onto its positive and negative wavenumber components. We discuss the well-posedness of these asymptotic equations and show that nonlinearity leads to strong spatial focusing of SPs. (Received September 20, 2015)