1078-76-275 **Jon Wilkening*** (wilken@math.berkeley.edu), Department of Mathematics, University of California, Berkeley, CA 94720-3840. *Elastic solitary water wave interactions.*

Multiple soliton solutions of integrable equations such as the Korteweg-deVries equation, the Benjamin-Ono equation, and the Nonlinear Schrödinger equation often feature elastic collisions. By contrast, the interaction of solitary Stokes waves for the Euler equations is inelastic. However, it has been observed many times in the literature that the residual radiation after a collision of Stokes waves can be remarkably small. I will show how to tune the background radiation to support solitary wave interactions that do not generate additional radiation after a collision. This is done by computing spatially and temporally periodic solutions of the full Euler equations in two solitonic regimes using high resolution numerical simulations. In shallow water with no surface tension, we find counter-propagating KdV-like "solitons" that collide elastically. In deep water with surface tension, we find elastic collisions of NLS-like solitons. A Floquet analysis shows that some of the solutions in each regime are stable to harmonic perturbations. (Received December 12, 2011)