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**Justin Holmer\*** (holmer@math.brown.edu) and **Donlapark Pornnopparith.** *Near amplitude crossing of mKdV double solitons.*

The mKdV equation  $\partial_t u = \partial_x(-u_{xx} - 2u^3)$  admits double-soliton solutions, obtained via inverse scattering theory, with parameters of position and amplitude. We prove a new asymptotic decomposition formula for the double-soliton profile into the sum of two single-solitons that remains valid as the amplitude parameters coincide. Using this formula, we give an explanation of the avoided-crossing phenomena discussed in Holmer, Perelman, & Zworski (2011), that emerges when one considers the dynamics of a double-soliton under the influence of a slowly-varying potential, i.e. as an approximate solution to  $\partial_t u = \partial_x(-u_{xx} + bu - 2u^3)$ , for  $b(x, t) = b_0(hx, ht)$  and  $0 < h \ll 1$ . The avoided-crossing is a dynamical scenario in which the scales of the two solitons become exponentially close inducing an abrupt switch in position of the two solitons. The results are supported by numerical computations. (Received February 10, 2013)