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Peter Bates, Giorgio Fusco and Jiayin Jin* (jin@math.gatech.edu), School of Mathematics, Georgia Institute of Technology, Atlanta, GA 30332. *Invariant Manifolds of Multi Interior Spike States for the Cahn-Hilliard Equation.*

We construct invariant manifolds of interior multi-spike states for the nonlinear Cahn-Hilliard equation and then investigate the dynamics on it. An equation for the motion of the spikes is derived. It turns out that the dynamics of interior spikes has a global character and each spike interacts with all the others and with the boundary. Moreover, we show that the speed of the interior spikes is super slow, which indicates the long time existence of dynamical multi-spike solutions in both positive and negative time. This result is obtained through the application of a companion abstract result concerning the existence of truly invariant manifolds with boundary when one has only approximately invariant manifolds. (Received August 19, 2015)