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Accelerating Fronts in Semilinear Wave Equations

I will study dynamics of interfaces in solutions of the equation $\varepsilon \Box u + \frac{1}{\varepsilon} f_\varepsilon(u) = 0$, for f_ε of the form $f_\varepsilon(u) = (u^2 - 1)(2u - \varepsilon\kappa)$, for $\kappa \in \mathbb{R}$, as well as more general, but qualitatively similar, nonlinearities. I will show that for suitable initial data, solutions exhibit interfaces that sweep out timelike hypersurfaces of mean curvature proportional to κ.

This is a joint work with Robert Jerrard (University of Toronto).