

1099-35-353

Stan Alama, Lia Bronsard* (bronsard@mcmaster.ca), **Andres Contreras** and **Dmitry Pelinovsky**, Dept of Math and Stats, McMaster University, Hamilton, ON L8S 4K1, Canada.

Domain walls for Gross-Pitaevskii systems.

A thorough study of domain wall solutions in coupled Gross-Pitaevskii equations on the real line is carried out including existence of these solutions; their spectral and nonlinear stability; their persistence and stability under a small localized potential. The proof of existence is variational and is presented in a general framework: we show that the domain wall solutions are energy minimizing within a class of vector-valued functions with nontrivial conditions at infinity. The admissible energy functionals include those corresponding to coupled Gross-Pitaevskii equations, arising in modeling of Bose-Einstein condensates. The results on spectral and nonlinear stability follow from properties of the linearized operator about the domain wall. The methods apply to many systems of interest and integrability is not germane to our analysis. Finally, sufficient conditions for persistence and stability of domain wall solutions are obtained to show that stable pinning occurs near maxima of the potential, thus giving rigorous justification to earlier results in the physics literature. (Received February 11, 2014)