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Peter D Miller* (millerpd@umich.edu), Department of Mathematics, East Hall, 530 Church St., Ann Arbor, MI 48109. *Integrable Problems for Semiclassical Nonlinear Waves*. Preliminary report.

Some recent work on singular asymptotic problems related to completely integrable systems will be described. Topics to be discussed as time allows include:

1) The large-N asymptotics of the N-soliton solution of the focusing nonlinear Schroedinger equation (joint work with Greg Lyng, U of Wyoming).

2) Strong continuum limit asymptotics for the Ablowitz-Ladik discretization of the defocusing nonlinear Schroedinger equation and relations to large degree asymptotics for polynomials orthogonal on the unit circle (joint work with Jeffery DiFranco and Guadalupe Lozano, U of Michigan).

3) Semiclassical (weak dispersion) asymptotics for a completely integrable modification of the focusing nonlinear Schroedinger equation, where the perturbation terms are physically relevant in the context of pulse propagation in anomalously dispersive optical fibers and can regularize the severe modulational instability that occurs in their absence (joint work with Jeffery DiFranco, U of Michigan).

4) Rigorous spectral asymptotics for the nonselfadjoint Zakharov-Shabat eigenvalue problem that occurs in the semiclassical inverse-scattering theory of the focusing nonlinear Schroedinger equation (joint work with Jared Bronski, U of Illinois, and Ken McLaughlin, U of Arizona). (Received September 25, 2005)