1057-35-305 **Robert Jenkins*** (rmjenkin@umich.edu). *Small dispersion limit of the focusing nonlinear Schrödinger equation for square barrier initial data.*

The small dispersion limit of the focusing nonlinear Schrödinger equation (fNLS) exhibits a rich structure with rapid oscillations at microscopic scales. Due to the non self-adjoint scattering problem associated to fNLS, very few rigorous results exist in the semiclassical limit. The asymptotics for reflectionless real WKB-like initial data was worked out by Kamvisis, McLaughlin, and Miller in 2003. In 2005, Tovbis, Venakides, and Zhou described the small dispersion limit for the family $q(x,0) = \operatorname{sech}^{1+\frac{i}{\epsilon}\mu}$.

We consider here another exactly solvable family of initial data, specifically the family of square barriers, $q(x,0) = q\chi_{[-L,L]}$ for real amplitudes q. Using Riemann-Hilbert techniques we obtain rigorous point-wise asymptotics for the semiclassical limit of fNLS globally in space and up to an $\mathcal{O}(1)$ maximal time. In particular we show that the discontinuities in the initial data regularize by the immediate generation of slowly modulated genus one oscillations emitted into the support of the initial data whose Riemann invariants evolve according to a self-similar solution of the corresponding Whitham equations. (Received January 25, 2010)