1016-35-293 **Jeffery C DiFranco*** (jeffcd@umich.edu), Department of Mathematics, University of Michigan, 2074 East Hall. 530 Church St., Ann Arbor, MI 48109-1043. *A Nonlinear Gibbs-Type Phenomenon For the Defocusing Nonlinear Schrödinger Equation.*

We analyze the Cauchy problem for the Defocusing nonlinear Schrödinger equation with the particular initial potential, $g(x)$, that is zero for $|x| > 1$ and 1 otherwise. For $t > 0$ the jump discontinuities of $g(x)$ are regularized by the onset of rapid oscillations. The behavior of these oscillations is realized as a nonlinear Gibbs Phenomenon. We prove that when t is small these oscillations can be described by an asymptotic expansion in powers of $t^{\frac{1}{2}}$ where the leading order term is given by an explicit special function. The analysis relies on the fact that the solutions to Cauchy problems for the Defocussing nonlinear Schrödinger equation can be obtained via an associated Riemann-Hilbert problem. We analyze the solution to this associated Riemann-Hilbert problem following the steepest-descent/stationary phase method for oscillatory Riemann-Hilbert problems introduced by Deift and Zhou in 1993 recognizing the distinct new feature that the solution depends on the behavior of the reflection coefficient at infinity rather then at a finite point or on an interval. (Received February 14, 2006)