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**Alexander Tovbis\***, Dept. of Mathematics, UCF, Orlando, FL 32816. *Abel transform as the semiclassical limit of the scattering transform for the focusing NLS*. Preliminary report.

The semiclassical limit of the focusing Nonlinear (cubic) Schrödinger Equation (NLS) corresponds to the singularly perturbed Zakharov Shabat (ZS) system that defines the direct and inverse scattering transforms (IST). We derive explicit expressions for the leading order terms of these transforms, which are called semiclassical limits of the direct and inverse scattering transforms. Thus, we establish an explicit connection between the decaying initial data of the form  $q(x, 0) = A(x)e^{iS(x)}$  and the leading order term of its scattering data. This connection is expressed in terms of an integral transform that can be viewed as a complexified version of an Abel type transform. Our technique is not based on the WKB analysis of the ZS system, but on the inversion of the modulation equations that solve the inverse scattering problem in the leading order. (Received August 31, 2009)