

1154-81-2067

**Michael A Maroun\*** (marounm@gmail.com). *A Generalized Nonlinear Schrodinger Equation.*

From the perspective of physics using only first principles, one arrives at a generalization of the nonlinear Schrödinger equation, which is notably different from the equation in the mathematical literature known as the nonlinear Schrödinger equation. The equation arrived at is also not the Gross-Pitaevskii equation. The two equations only coinciding if the Riesz transform were convolution with the identity, which it is not. Some possible distributional and  $L^p$  solutions are investigated. The full facts about  $L^p$  solutions is believed to be open. Of particular interest are rotationally invariant solutions. The physical significance of the equation is that it in principle captures the self-energy of a bound electron, and may also provide a context for the Uehling potential.

(Received September 17, 2019)