Seeking An Effective Dispersion Relation in Solutions to the Nls and Measuring Effective Nonlinearity

The linear part of the Nonlinear Schrödinger Equation (NLS) \( iq_t = q_{xx} \) has dispersion relation \( \omega = k^2 \). We don't expect solutions to the fully nonlinear equation to behave nicely or have any kind of effective dispersion relation like this. However, I have seen that solutions to the NLS are actually weakly coupled and are often nearly sinusoidal in time with a dominant frequency, often behaving similarly to modulated plane waves. In fact, these highly nonlinear solutions eventually end up behaving more and more linearly.

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Time: 4:00 – 5:00 PM
Location: Lally 02