Texas Tech University. Applied Mathematics Seminar.

# STABLE DIRECTIONS FOR DEGENERATE EXCITED STATES OF NONLINEAR SCHRÖDINGER EQUATIONS

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ABSTRACT. We consider the nonlinear Schrödinger equations $i\partial_t\psi = H_0\psi + \lambda|\psi|^2\psi$ in $\mathbb{R}^3 \times [0,\infty)$ where $H_0 = -\Delta + V$ and $\lambda = \pm 1$. Assume that the potential $V$ is radial and decays sufficiently fast at infinity. Assume also that the linear Hamiltonian $H_0$ has only two discrete eigenvalues $e_0 < e_1 < 0$ where $e_0$ is simple and $e_1$ has multiplicities 3. We show that there exist three branches of nonlinear excited states and for certain finite codimesion subset in the space of initial data, we construct solutions $\psi$ converging to these excited states in both non-resonant and resonant cases.

This is the joint work with Stephen Gustafson.