

Colloquium

Eigenvalue estimate of nonlinear Schrödinger equations

主講人：林太家 教授
國立臺灣大學數學系

時 間：106 年 10 月 18 日(三) 14 : 30

地 點：應用數學系多媒體教室（理408 室）

摘 要：

The virial theorem is a nice property for the linear Schrödinger equation in atomic and molecular physics as it gives an elegant ratio between the kinetic and potential energies and is useful in assessing the quality of numerically computed eigenvalues. If the governing equation is a nonlinear Schrödinger equation with power-law nonlinearity, then a similar ratio can be obtained but there seems no way of getting any eigenvalue estimate. It is surprising as far as we are concerned that when the nonlinearity is either square root or saturable nonlinearity (not a power-law), one can develop a virial theorem and eigenvalue estimate of nonlinear Schrödinger (NLS) equations in $\mathbb{R}^2$ with square root and saturable nonlinearity, respectively. Furthermore, the eigenvalue estimate can be used to prove the 2nd order term (which is of order $\ln \Gamma$) of the lower bound of the ground state energy as the coefficient Γ of the nonlinear term tends to infinity.