



復旦大學
FUDAN UNIVERSITY

Applied Math
Ph.D. Seminar

Energy Transfer and Radiation in Hamiltonian Nonlinear Klein-Gordon Equations

Speaker: Zhaojie Yang (Fudan University)

Time: 2023-09-14, 16:10 to 17:00

Location: Rm 1801, Guanghua East Tower

Advisor: Zhen Lei (Fudan University)

Abstract: We consider Klein-Gordon equations with cubic nonlinearity in three spatial dimensions. It is assumed that the corresponding Klein-Gordon operator admits an arbitrary number of possibly degenerate eigenvalues in $(0, m)$, and hence the unperturbed linear equation has multiple time-periodic solutions known as bound states. In 1999, Soffer and Weinstein discovered a mechanism called Fermi's Golden Rule for this nonlinear system in the case of one simple but relatively large eigenvalue $\Omega \in (\frac{m}{3}, m)$, by which energy is transferred from discrete to continuum modes and the solution still decays in time. Since then, many efforts have been made in the case of relatively small eigenvalue, in which Fermi's golden rule fails, and the case of general multiple eigenvalue. In 2022, we solved the general one simple eigenvalue case. In our recent work, we solved this problem in full generality: multiple and simple or degenerate eigenvalues in $(0, m)$. Indeed, we obtained the sharp rate of energy transfer from one discrete state to continuum modes in the most general case.