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TALK CANCELLED: The focusing NLS equation with oscillating backgrounds: the shock problem

Thursday, July 1, 2021 9:30 AM (40 minutes)

This lecture is cancelled, the talks will resume as usual at 10:20.

I will consider a solution $q(x, t)$ for the focusing nonlinear Schrödinger equation $iq_t + q_{xx} + 2|q|^2q = 0$ with initial values $q(x, 0) \approx A_1 e^{i\phi_1} e^{-2iB_1 x}$ as $x \rightarrow -\infty$ and $q(x, 0) \approx A_2 e^{i\phi_2} e^{-2iB_2 x}$ as $x \rightarrow +\infty$.

I'm interested in its long-time asymptotics. It is qualitatively different in sectors $\xi_{i+1} < \xi := \frac{x}{t} < \xi_i$ of the (x, t) half-plane and the goal is to determine these sectors and the asymptotics of q in each of them.

I will concentrate on the shock case ($B_1 < B_2$). The case $B_1 = B_2$ has already been studied by Biondini and Mantzavinos (CPAM 2017) and the rarefaction case ($B_2 < B_1$) is close to the case $A_1 = 0$ studied in a paper with Kotlyarov and Shepelsky (IMRN 2011).

The shock case has already been considered by Buckingham and Venakides (CPAM 2007). I will show it is actually rich in asymptotic scenarios. I will present these different scenarios. They depend on the relative values of the parameters A_j, B_j . (This is joint work with Jonatan Lenells and Dmitry Shepelsky.)

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