武汉物数所理论交叉学术交流系列报告

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Suppression of collisional loss in strongly-interacting ultracold gases via Fano effect

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About the speaker：

Peng Zhang received his PhD at the ITP, CAS in 2005, and then did postdoctoral research at the Georgia Institute of Technology and ERATO project at the University of Tokyo in Japan. From 2010 until now he works as a full professor at the Renmin University of China. He was awarded the "Excellent Youth" title. He also recently received an Excellent-Lecturer Award from this university. His research interest is mainly on few-body problems in ultracold gases and quantum optics.

Abstract： In 1961, Ugo Fano proposed that the inelastic scattering from channel a to channel b can be suppressed by the coupling channel b to an isolated bound state in another channel c. In Fano's work, the coupling between channels a and b are treated as a first-order perturbation. In this job we first study this effect in a two-channel problem with time-reversal symmetry. We go beyond the 1st-order perturbation theory and do an exact calculation for the scattering amplitude. We find that in this system, due to the time-reversal symmetry, the inelastic scattering can be always completely eliminated, no matter if the a-b coupling is a perturbation or not. Using this result, we further studied the suppression of two-atom collisional decay in an ultracold gas where the inter-atom elastic scattering length is very large.

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