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## **【12】 The angulon quasiparticle: novel approach to angular momentum in quantum many-particle systems**

*Wednesday 23 August 2017 12:00 (30 minutes)*

Recently we have predicted a new quasiparticle - the angulon - which is formed when a quantum impurity (such as a molecule, atom, or electron) exchanges its orbital angular momentum with a many-particle environment (such as lattice phonons or a superfluid) [1,2].

Soon thereafter we obtained strong evidence that angulons do exist, and are, in fact, created in experiments on molecules trapped inside superfluid helium nanodroplets [3]. The angulon theory thereby provided a simple explanation for experimental data accumulated during last two decades. Moreover, casting the many-particle problem in terms of angulons amounts to a drastic simplification and allows to tackle previously intractable problems [4].

In this talk we will introduce the angulon concept and discuss novel physical phenomena [1,5] arising from the angular momentum exchange in quantum many-particle systems. We will describe the applications of angulons to modern experiments on controllable molecules and ultracold quantum gases.

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[5] E. Yakaboylu, M. Lemeshko, Phys. Rev. Lett., 118, 085302 (2017)

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