Title: Novel three-body bound states in atomic mixtures.

Abstract:

One of the most intriguing phenomenon of few-body physics is the Efimov effect [1], which manifests itself in an infinite number of weakly bound three-body states if at least two of the three two-body subsystems exhibit a single weakly s-wave bound state or resonance. Although this effect was predicted almost half of a century ago, it has only recently been successfully verified [2] in experiments with the different cold atomic mixtures.

In this talk I provide an introduction into the mechanisms of forming bound states in few-body physics and briefly review the main theoretical ingredients of as well as the experiments confirming the Efimov effect, and present then a new series of the three-body bound states. The three-body system considered in this context consists of a light particle and two heavy ones, when the heavy-light short-range interaction potential has a resonant state with a non-zero orbital angular momentum [3], e.g., the p-wave resonant state. Such a system is in sharp contrast to the standard Efimov scenario, when the heavy-light short-range interaction has always the s-wave resonance. In summary I analyze possible avenues to verify this new effect experimentally.