

凝縮系物理学インフォーマルセミナー

Condensed Matter Seminar

Location: Room 413, School of Science Bldg. 5 (理学 5 号館 413 号室)
Time and date: 13:30 – 15:00, Thursday, 7 August 2014

Coleman-Weinberg mechanism in a spinor Bose-Einstein condensate

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Abstract:

Ultracold atoms have offered an ideal playground to study a Bose-Einstein condensate (BEC) thanks to high controllability and flexibility of the systems. One of the interesting systems realized in cold atoms is a BEC with spin, which is also known as a spinor BEC. A spinor BEC has attracted attention since it allows to present with a variety of phase structures originating from an interplay between charge and spin.

In this seminar, I would like to focus on quantum fluctuation effects in a continuous phase transition between different ordered phases in a spinor BEC predicted by the mean-field theory. By analyzing Lee-Huang-Yang corrections in the condensate, I show that the so-called Coleman-Weinberg mechanism takes place in the transition, namely, fluctuation-induced first-order phase transition occurs. I exemplify this with an experimentally relevant case and show that a measurement of a condensate depletion can be utilized to confirm the first-order phase transition.