

第 5 回物理学教室談話会

講演題目： Ontic- or epistemic-distinguishability of
identical particles by using the Aharonov-Bohm effect

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日 時：11 月 6 日 (木) 16 : 40～18 : 10

場 所：講義室 W1-B211 室

要 旨

The setup of the Einstein-Podolsky-Rosen (EPR) paradox, which is the most profound problem in quantum mechanics, leads to an observer-dependent description of the quantum state from a quantum information perspective. While this problem is originally based on a single-particle system, it can be extended to systems with many identical particles. We propose an experimental approach to clarify the quantum state description for identical particles, utilizing the three particle Aharonov-Bohm effect [A. Noguchi, YS, K. Toyoda, and S. Urabe, Nat. Comm. 5, 3868 (2014)]. In this seminar, we review the EPR paradox from a quantum information viewpoint and point out the discrepancy between the two parties problem and two particles problem. Finally, we provide the different quantum-state descriptions with and without knowing the situation to reveal ontic or epistemic properties of the identical particle.

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