

第201回エンレイソウの会

場 所： 北海道大学工学部A棟A1-17

日 時： 2014年6月25日（水） 16:30～18:00

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題 目： 『Quantum Fidelity: scaling and role of marginality』

要 旨：The order parameter is the fundamental quantity in describing a second-order quantum phase transition. It is zero in the disordered phase and non-zero in the ordered phase and therefore can be used to locate a quantum-critical point where transition from the ordered state to the disordered state takes place. But there exists a measure which do not require the information of the order-parameter to detect a second-order quantum critical point namely, 'Ground-state Quantum Fidelity' which is the overlap between two different ground states. Ground state quantum fidelity shows a sharp drop at the quantum critical point and hence marks the position of the quantum-critical point. I will introduce its scaling and the marginal situation where the behavior of the fidelity is markedly different from that usually seen; this will be illustrated with the example of the two-dimensional (2-D) Dirac Hamiltonian in the presence of a mass term which is tuned to zero at the Dirac point where the sharp dip in fidelity is absent unlike usually observed.

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