

**The 1th IOPP Seminar : Dr. Ming Li, University of Connecticut, USA (美国康涅狄格大学), Dec. 18, 2019, Thursday, 10:00 am, Room 9409**

Title: JIMWLK Equation From Quantum-Classical Correspondence

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Abstract:

In Color Glass Condensate effective theory for high energy quantum chromodynamics, hard gluons whose longitudinal momenta larger than some cutoff scale are characterized by color currents. When calculating observables, averaging over hard gluonic degrees of freedom is implemented by integrating over classical color currents with some probabilistic weight functional. The evolution of the weight functional with the cutoff scale follows the Jalilian-Marian, Iancu, McLerran, Weigert, Leonidov, Kovner (JIMWLK) equation for dense color currents in the leading logarithmic approximation. In this talk, I will first give a pedagogical review of the two different ways of deriving the JIMWLK equation. I then talk about a different perspective of obtaining the JIMWLK equation from the density matrix approach of open quantum systems. We introduce an effective density matrix for hard gluons and show its evolution with rapidity has the form of Lindblad equation. The JIMWLK equation is reproduced by formulating the Lindblad equation in the non-Abelian phase space spanned by the classical color currents using Weyl's quantum-classical correspondence rules. The weight functional naturally relates to the density matrix through the Wigner transformation.

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