

MP 3: HV 2: Non-Equilibrium Quantum Field Theory

Time: Tuesday 11:45–12:25

Location: H7

Invited Talk

MP 3.1 Tue 11:45 H7

Path integral based non-equilibrium quantum field theory of non-relativistic pairs inside an environment — •TOBIAS BINDER
— Kavli IPMU, Kashiwanoha, Japan

We derive differential equations from path-integral based non-equilibrium quantum field theory, that cover the dynamics and spectrum of non-relativistic two-body fields for any environment. For concreteness of the two-body fields, we choose the full potential non-relativistic Quantum Electrodynamics Lagrangian in this work. After closing the correlation function hierarchy of these equations and per-

forming consistency checks with previous literature under certain limits, we demonstrate the range of physics applications. This includes Cosmology such as Dark Matter in the primordial plasma, Quarkonia inside a quark gluon plasma, and superconductivity and Ferromagnetism in Condensed or strongly Correlated Matter physics. Since we always had to take limits or approximations of our equations in order to recover those known cases, our equations could contain new phenomena. In particular they are based on Green's functions that can deal with non-hermite potentials. We propose a scheme for other Lagrangian based theories or higher N-body states such as molecules to derive analog equations.