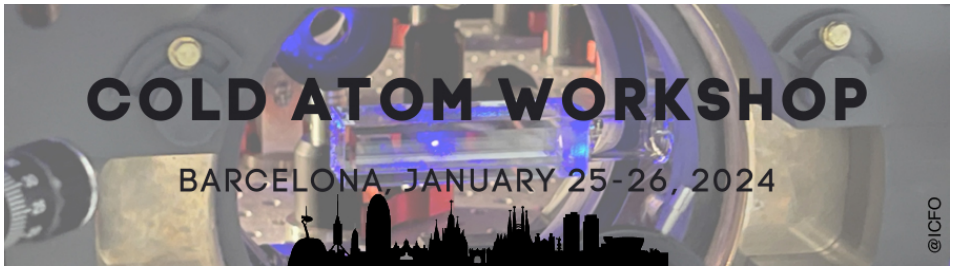

Contribution ID: **10** Type: **not specified**

Modeling Particle Loss in Open Systems using Keldysh Path Integral and Second Order Cumulant Expansion

Thursday 25 January 2024 16:00 (20 minutes)

For open quantum systems, integration of the bath degrees of freedom using the second order cumulant expansion in the Keldysh path integral provides an alternative derivation of the effective action for systems coupled to general baths. The baths can be interacting and not necessarily Markovian. Using this method in the Markovian limit, we compute the particle loss dynamics in various models of ultra-cold atomic gases including a one-dimensional Bose-Hubbard model with two-particle losses and a multi-component Fermi gas with interactions tuned by an optical Feshbach resonance. We explicitly demonstrate that the limit of strong two-body losses can be treated by formulating an indirect loss scheme to describe the bath-system coupling. The particle-loss dynamics thus obtained is valid at all temperatures. For the one-dimensional Bose-Hubbard model, we compare it to solutions of the phenomenological rate equations. The latter are shown to be accurate at high temperatures.

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Session Classification: Day 1