

Abstract Submitted
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Many-body dynamics of driven-dissipative Rydberg cavity polaritons¹ TIM PISTORIUS, Institut für theoretische Physik, Leibniz Universität Hannover, JINGTAO FAN, Institute of Laser Spectroscopy, Shanxi University, HENDRIK WEIMER, Institut für theoretische Physik, Leibniz Universität Hannover — The usage of photons as long-range information carriers has greatly increased the interest in systems with nonlinear optical properties in recent years. The nonlinearity is easily achievable in Rydberg mediums through the strong van der Waals interaction which makes them one of the best candidates for such a system. Here, we propose a way to analyze the steady state solutions of a Rydberg medium in a cavity through the combination of the variational principle² for open quantum systems and the P-distribution of the density matrix. To get a better understanding of the many-body-dynamics a transformation into the polariton picture is performed and investigated.

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²H. Weimer, Variational Principle for Steady States of Dissipative Quantum Many-Body Systems, Phys. Rev. Lett. **114**, 040402 (2015).

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