

Abstract Submitted  
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**Application of the positive-P representation to self-organization in optical lattices** RAY NG, ERIK S. SORESEN, McMaster University — The study of real time dynamics in a quantum system is very difficult. The recent development of simulational methods based on the positive-P representation in quantum optics have demonstrated the feasibility of obtaining reliable results out to intermediate time scales. The method converts the master equation of a quantum mechanical system to a Fokker-Planck Equation (FPE), which can then be mapped on to a set of Stochastic Differential Equations (SDEs) making the method ideal for treating This makes it an ideal open systems. In this poster we discuss how the positive-P representation is applied to a the problem of self-organization of atoms in an optical lattices with a coupling to a resonant mode. We explicitly show how the final SDEs are derived and discuss strategies for simulating these equations. Improvements on the positive-P representaion of the model in terms of so called gauge-P representations is also discussed.

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