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Monte Carlo Simulation of Spontaneous Emission from Dressed States[1] B. BARRETT, S. BEATTIE, A. KUMARAKRISHNAN, York University, YORK UNIVERSITY TEAM — It is well known that atomic states coupled with the photon field can be described by the dressed state basis. In previous work (J. Opt. Soc. Am. B **2**, 1707, Phys. Rev. A **47**, 2128) the atomic density matrix elements have been modeled in the dressed state basis, from which the spontaneous emission rates from dressed states can be calculated. We use this treatment to model the results of a recent experiment that uses a single state atom interferometer and laser cooled ^{85}Rb atoms. The effective spontaneous emission rate measured in the experiment shows a monotonic increase as a function of "interaction time"—the time atoms are subjected to standing wave laser pulses. We describe the details of the experiment and a Monte Carlo simulation of spontaneous emission from dressed states in a standing wave to explain the results. The results of the simulation show qualitative agreement with the experiment and suggest that the origin of the effect is related to the variation of the spontaneous emission rate in the standing wave potential and the spatial profile of the laser beams.

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