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Trap losses induced by Rydberg dressing of cold atomic gases[1]
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The near-resonant dressing of ultracold strontium gases and BECs contained in an optical dipole trap (ODT) with the $n = 30\ ^3S_1$ Rydberg state is investigated as a function of the effective two-photon Rabi frequency, detuning, and dressing time. The measurements demonstrate that, even when well detuned from resonance, such dressing can lead to a rapid decrease in the ground-state atom population in the ODT. This decrease is attributed to Rydberg atom excitation which can lead to direct escape from the trap and/or population of very-long-lived metastable states. The large Rydberg atom production rates are explained using a reaction model in which the initial excitation of a Rydberg atom triggers the excitation of neighboring atoms leading to rapid avalanche-like growth in the Rydberg population.

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