

Abstract Submitted  
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**Approaching a final temperature prediction of an ensemble of atoms undergoing cavity-assisted cooling in the superradiant regime** RON PEPINO, Florida Southern College, MURRAY HOLLAND, JILA, University of Colorado — We present results that determine the final temperature of an ensemble of atoms being supercooled in an optical resonator in the parameter regime of superradiance. We verify that one can perform a classical treatment of the light field and still recover the important lasing and superradiant physics. This treatment yields a set of equations that contain no spin correlations. As a consequence this work ultimately shows that the quantum spin-spin correlations between atoms can be safely neglected in computational models in certain parameter regimes. Such a treatment may significantly reduce the size of the Hilbert space and therefore computational complexity needed to compute the final temperature.

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