Abstract Submitted
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**Coherent State Description of the Bichromatic Force**[1] HAROLD METCALF, Stony Brook University — The usual description of the bichromatic force (BF) has always been in terms of atomic dressed states in a two-frequency field.[2] However, laser cooling with the BF in the absence of spontaneous emission[3] has led to entropy questions. We propose a description of the BF in terms of quantized fields to address such questions. Clearly number state descriptions of the two, few-mW light fields are not appropriate, so we describe them using coherent states. The description starts by considering these light fields first and bringing in the atoms afterward, just the reverse sequence of previous descriptions. The coherent states $|\alpha_k\rangle$ are defined in the customary way as $|\alpha_k\rangle \equiv e^{-|\alpha_k|^2/2} \sum_{n_k} \{\alpha^{n_k}/\sqrt{n_k!}\} |n_k\rangle$, where $k$ is a label for either red or blue detuned light. As usual, $|\alpha_k\rangle$ represents a coherent state, $\alpha_k$ is a complex number, and $|n_k\rangle$ represents a number state corresponding to the summation integer $n_k$. The resulting eigenenergies are identical to those found previously and the description of the BF follows naturally.[2]

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[2]H. Metcalf, Rev. Mod. Phys. **89** 041001 (2017) and its Ref's.
[3]C. Corder et al., Phys. Rev. Lett. **114** 043002 (2015).

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