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A phonon laser using quantum dot spin states ALEXANDER KHAETSKII, XUEDONG HU, IGOR ZUTIC , University at Buffalo, SUNY — Sound analog of laser (saser) has not yet been realized experimentally, though some steps in this direction have been made recently [1]. As is known, the main reason impeding coherent generation of phonons in solid state is high density of phonon states [2]. We suggest a particular realization of saser, which consists of an ensemble of quantum dots and uses the Zeeman-split spin levels of the ground orbital state in the quantum dot. We develop a complete set of saser equations taking into account the Coulomb blockade conditions for a quantum dot, and evaluate all the parameters such as the threshold, output power and efficiency of the device. Supported by NSF-ECCS and US ONR, NSF PIF,and US ARO. [1]. R.P. Beardsley et al., PRL **104,** 085501 (2010). [2]. J. Chen and J.B. Khurgin, IEEE Journal of Quantum Electronics, **39**, 600 (2003) .

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