Abstract Submitted
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A Tonks Giradeau Gas in the Presence of a Local Potential[1] HAO FU, University of Michigan, ALBERTO ROJO, Oakland University — The physics of a Tonks-Giradeau Gas in the presence of a local potential is studied. In order to evaluate the single particle density matrix (SPDM) of the many-body ground state, the Wiger-Jordan transformation is used. The eigenvector with the largest eigenvalue of the SPDM corresponds to the "Bose-Einstein Condensate"(BEC) State. We find that the "BEC" state density at the positon of the local potential decreases, as expected, in the case of a repulsive potential. For an attractive potential, it decreases or increases depending on the strength of the potential. The superfluidity of this system is investigated both numerically and perturbatively. An experimental method for detecting the effect of an impurity in a Tonks-Giradueau gas is discussed.

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