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Solitons in Trapped Bose-Einstein condensates in one-dimensional optical lattices
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— We use Quantum Monte Carlo simulations to show the presence and study the properties of solitons in the one dimensional soft-core bosonic Hubbard model with near neighbor interaction in traps. We show that when the half-filled Charge Density Wave (CDW) phase is doped, solitons are produced and quasi long range order established. We discuss the implications of these results for the presence and robustness of this solitonic phase in Bose-Einstein Condensates on one dimensional optical lattices in traps and study the associated excitation spectrum. The density profile exhibits the coexistence of Mott insulator, CDW, and superfluid regions. Work supported by NSF DMR 0312261 and NSF INT 0124863.

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