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One-dimensional anyons under three-body interactions.[1] JERESON SILVA-VALENCIA, JULIAN ARCILA- FORERO, ROBERTO FRANCO, Universidad Nacional de Colombia — Anyons are a third class of particles with nontrivial exchange statistics, particles carrying fractional statistics that interpolate between bosons and fermions. In the last years, it has been made some proposals to emulate an anyon gas by confining bosonic atoms in optical lattices [Nat. Commun. 2, 361 (2011)]. In this work, we studied the ground state of anyons interacting through local three-body terms in one-dimension, motivated by recent experimental and theoretical studies about multi-body interactions in cold atoms setups. We used the density-matrix renormalization group method to find the phase diagram and the von Neumann block entropy to determinate the critical point position. The main quantum phases found are the superfluid and the Mott insulator ones. For the statistical angle $\theta = \pi/4$, the phase diagram shows that the Mott lobes are surrounded by superfluid regions, the Mott lobes increase with the density and the first Mott lobe has two anyons per site. We found that a Mott lobe with one anyon per site, it is possible for larger statistical angles, a fact that it is impossible with bosons.

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