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Devil's staircase and supersolidity in one-dimensional dipolar Bose gases S.L. SONDHI, F.J. BURNELL, MEERA M. PARISH, Princeton University, N.R. COOPER[1], Cambridge University — The classical ground states of particles in a convex repulsive potential are known to have a phase portrait displaying a complete devil's staircase structure. We consider a single- component gas of dipolar bosons confined in a one-dimensional optical lattice, where the dipoles are aligned such that the long-ranged dipolar interactions are maximally repulsive. Introducing a kinetic term tunes the system away from the classical limit and results in a phase diagram with a Mott- Hubbard lobe for each rational filling fraction. Tuning the on- site interaction away from convexity yields alternative commensurate states with double occupancies which can form a staircase of their own, as well as one dimensional "supersolids" which simultaneously exhibit discrete broken symmetries and superfluidity.

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