

# Roton in a few-body dipolar system

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We solve numerically the many-body 1D model of bosons interacting via short-range and dipolar forces and moving in the box with periodic boundary conditions. We show that the lowest energy states with fixed total momentum, so called yrast state, can be smoothly transformed from the solitons to a Bogoliubov excitations. In particular, we identify the celebrated roton state. The smooth transition is realized by simultaneous tuning short-range interactions and adjusting a trap geometry. With our methods we study the weakly interacting regime as well as the regime beyond the range of validity of the Bogoliubov approximation.