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Dipolar quantum gas in a bubble trap

SILVA, Pedro Diniz¹; HENN, Emanuel Alves de Lima¹

pedro.diniz@usp.br

¹Instituto de Física de São Carlos - USP

We have been investigating quantum gases with dipole-dipole interactions in curved potential landscapes - in particular, a shell-like trapping potential. (1) Dipole-dipole interactions between polarized particles are long-ranged and anisotropic since the dipolar interaction potential is given by $V_{dd} = \frac{\mu_0 \mu^2}{4\pi} \frac{1-3\cos^2\theta}{r^3}$, where μ is the magnetic moment, r the distance between particles and θ the angle between the polarization direction and the line connecting the particles. Such combination, of dipole interactions and curved geometries creates interesting possibilities concerning the ground state of quantum gases, computed via the Gross-Pitaevskii equation. In this work we summarize our current results and findings in the ground state of a dipolar quantum gas in a tunable shell geometry.

Palavras-chave: Bose-Einstein condensate; Bubble trap; Dipole-dipole interactions.

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1 DINIZ, P.C. *et al.* Ground state and collective excitations of a dipolar Bose-Einstein condensate in a bubble trap. **Scientific Reports**, v. 10, n. 4831, 2020. DOI: 10.1038/s41598-020-61657-0.