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Instability of “bosonic matter” in all dimensions ☆

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Abstract

An upper bound is derived for the exact ground state energy E_N of N negatively charged bosons and N motionless, i.e., fixed, positive charges with Coulombic interactions in arbitrary dimensions ν: $E_N < -N^{(2+\nu)/\nu}/16\pi^2\nu^3(2)^\nu$, in units of the Rydberg, for all $N \geqslant (2)^\nu$ thus establishing, in particular, that the instability of “bosonic matter” is not a characteristic of the dimensionality of space.