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Benjamin Schlein: ”Upper bounds on the ground state energy of dilute hard spheres”

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We review some recent estimates on the energy of bosons interacting through hard-sphere potentials. We first discuss Bose gases in the Gross-Pitaevskii regime, in which N hard spheres with radius of order 1/N move on the unit torus; in this setting, we show an upper bound for the ground state energy, valid up to errors that vanish as N tends to infinity. We conclude presenting a simple new bound for hard spheres in the thermodynamic limit, resolving the ground state energy up to an error comparable with the so-called Lee-Huang-Yang corrections.