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Nonexistence of minimizers in the liquid drop model and TFDW theory

Abstract:

It is a conjecture that the energy in the liquid drop model is minimized by a ball when the mass is small, and the minimizer does not exist when the mass is large. The nonexistence part has been proved by Knuepfer-Muratov and Lu-Otto, but their methods are rather involved. We will provide a new, simpler proof for the nonexistence with an explicit bound. Our techniques can be developed to prove the nonexistence highly negative ions in the Thomas-Fermi-DiracWeizscker theory, which has been open for a long time. The talk is based on joint works with Rupert L. Frank, Rowan Killip and Hanne Van Den Bosch.