

Continuous and discrete ground states of the interaction energy: numerics and analytical results

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We study lowest-energy distributions (ground states) of N classical particles interacting through a pair potential. In many cases these ground states form interesting large-scale structures: they exhibit regular patterns in the form of a crystal, they approach continuous distributions, and in some cases they accumulate in sets of small dimension. We will present some recent analytical results on their behaviour, in particular the fact that the discrete ground states approximate continuous ground states as the number of particles tends to infinity. We will also present some conjectures supported by numerical simulations.