

Small eigenvalues and metastability for semiclassical Boltzmann operators

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We consider some inhomogeneous linear Boltzmann equations in a low temperature regime and in the presence of an external force deriving from a potential. We provide a sharp description of the spectrum near 0 of the associated operators. It enables us to obtain some precise information on the long time behavior of the solutions with

in particular some quantitative results of return to equilibrium and metastability.

This type of work usually requires two steps.

First, we establish some resolvent estimates thanks to hypocoercive methods.

We can then use and adapt some constructions of 'gaussian quasimodes' (approximated eigenfunctions) involving some tools from semiclassical microlocal analysis which will provide the desired sharp localization of the small eigenvalues.

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