Semiclassical Origin of Density Functionals ATILIA CANGI, PETER ELLIOTT, DONGHYUNG LEE, KIERON BURKE, University of California, Irvine — We use methods of semiclassical physics [1] to study the basic ingredients of DFT in terms of an asymptotic expansion in powers of the particle number. As an example we derive an approximate many-particle density [2] of a general potential in a one-dimensional system with hard walls. If the Fermi level lies above the maximum of the potential, we obtain densities very close to the exact answer, even for a small particle number. Density oscillations due to the effect of the boundaries are also present.


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