

Abstract Submitted
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Leading approximations to local corrections II: The case with turning points¹ RAPHAEL RIBEIRO, University of California San Diego, KIERON BURKE, University of California Irvine — Semiclassical uniform approximations are employed to study the leading energetic corrections to Thomas-Fermi theory for 1d noninteracting fermions coupled to a confining potential $v(x)$ in the semiclassical limit. Novel universal analytical results are given on the leakage of particle density beyond classical turning points and the resulting energetic consequences are derived in the semiclassical limit. These are confirmed by a systematic numerical study of the semiclassical limiting behavior of the global, regional and pointwise properties of fermions in a diverse set of potentials including double wells. Singular situations where the semiclassical approximation breaks down are verified. The connection to DFT developments will also be discussed.

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