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How Much Energy Does It Cost to Make a Hole in the Fermi Sea?

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Abstract. The change in energy of an ideal Fermi gas when a local one-body potential is inserted into the system, or when the density is changed locally, are important quantities in condensed matter physics. We show that they both can be bounded from below by a universal constant times the value given by the semi-classical approximation. This corresponds to a version of the Lieb–Thirring inequality in the continuous spectrum of Schrödinger operators. The talk is based on joint work with M. Lewin, E. Lieb, and R. Seiringer.