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Lower bounds for Coulomb energy for functions in homogeneous fractional Sobolev spaces

Abstract

We prove L^p lower bounds for Coulomb energy for radially symmetric functions in $\dot{H}^s(\mathbb{R}^3)$ with $\frac{1}{2} < s < \frac{3}{2}$. By this bound we can improve Sobolev embedding for radial functions in $\dot{H}^s(\mathbb{R}^3)$ with bounded Coulomb energy. This result is sharp for $\frac{1}{2} < s < 1$. Work in collaboration with Jacopo Bellazzini (Univ. Sassari) and Tohru Ozawa (Univ. Tokyo).