Mathematics > Classical Analysis and ODEs

Uncertainty principles for integral operators

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The aim of this paper is to prove new uncertainty principles for an integral operator $\tt$ with a bounded kernel for which there is a Plancherel theorem. The first of these results is an extension of Faris's local uncertainty principle which states that if a nonzero function $f\in L^2(\R^d,\mu)$ is highly localized near a single point then $\tt (f)$ cannot be concentrated in a set of finite measure. The second result extends the Benedicks-Amrein-Berthier uncertainty principle and states that a nonzero function $f\in L^2(\R^d,\mu)$ and its integral transform $\tt (f)$ cannot both have support of finite measure. From these two results we deduce a global uncertainty principle of Heisenberg type for the transformation $\tt$. We apply our results to obtain a new uncertainty principles for the Dunkl and Clifford Fourier transforms.

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