

**GEOMETRIC CONVOLUTIONS AND FOURIER RESTRICTION
BEYOND CURVES AND HYPERSURFACES**

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Abstract: I will present recent results relating to two problems in Fourier analysis, L^p -improving properties of convolutions with singular measures and the Fourier restriction problem, both of which deal with the analysis of operators associated to submanifolds of Euclidean space. In both cases the theory is much more well-developed for curves and hypersurfaces than it is for submanifolds of intermediate dimension. This relative lack of positive results is due in part to the problem that the Phong-Stein nonvanishing rotational curvature condition is frequently impossible to satisfy for surprisingly deep algebraic reasons. I will focus primarily on the case of 2-surfaces in \mathbb{R}^5 , which does not fit nicely into previously-existing combinatorial strategies, and will present a new approach with the potential to apply to a broad range of new cases.