Public Abstract
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The first topic of this dissertation is concerned with the L^2 boundedness of a maximal Fourier integral operator which arises by transferring the spherical maximal operator on the sphere S^n to a Euclidean space of the same dimension. Thus, we obtain a new proof of the boundedness of the spherical maximal function on S^n.

In the second part, we obtain boundedness for m-linear multiplier operators from a product of Lebesgue (or Hardy spaces) on R^n to a Lebesgue space on R^n, with indices ranging from zero to infinity. The multipliers lie in an L^2-based Sobolev space on R^{mn} uniformly over all annuli, just as in Hörmander's classical multiplier condition. Moreover, via proofs or counterexamples, we find the optimal range of indices for which the boundedness holds within this class of multilinear Fourier multipliers.