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Cones are not Salem

The notions of Hausdorff and Fourier dimensions are ubiquitous in harmonic analysis and geometric measure theory. It is known that any hypersurface in $\mathbb{R}^{d+1}$ has Hausdorff dimension d. However, the Fourier dimension depends on the finer geometric properties of the hypersurface. For instance, the Fourier dimension of a hyperplane is 0, and the Fourier dimension of a hypersurface with non-vanishing Gaussian curvature is d. Recently, Harris has shown that the Euclidean light cone in $\mathbb{R}^{d+1}$ has Fourier dimension $d-1$, which leads one to conjecture that the Fourier dimension of a hypersurface equals the number of non-vanishing principal curvatures. We prove this conjecture for all d-dimensional cones in $\mathbb{R}^{d+1}$ generated by hypersurfaces in $\mathbb{R}^d$ with non-vanishing Gaussian curvature. In particular, cones are not Salem. Our method involves substantial generalizations of Harris's strategy.