## EXPLORING MATROIDS: FROM HAMMING WEIGHTS TO SYMBOLIC POWERS

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ABSTRACT. Matroids beautifully interweave combinatorics, algebra, and geometry. In this talk, I will reveal a surprising connection between generalized Hamming weights in coding theory and the symbolic powers of Stanley-Reisner ideals associated with matroids. I begin with the observation that the minimum distance of a code corresponds to the initial degree of the Stanley–Reisner ideal of its dual matroid. Building on this, I demonstrate how higher Hamming weights naturally emerge from the symbolic powers of these ideals. Most intriguingly, I show that squarefree monomials alone determine all symbolic powers, unveiling hidden algebraic patterns within matroids.