Grid covering problems

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The minimum number of hyperplanes required to cover every point of $\mathbb{F}_q^n$ while missing one is equal to $n(q-1)+1$. This classical result of Jamison has been generalized in various directions. In particular, for any finite grid over any field $\mathbb{F}$, the answer was obtained by Alon and Füredi, who also proved a bound on the number of points missed by any collection of hyperplanes. Their bound can be seen as a generalization of the formula for the minimum Hamming weight of Reed-Muller codes.

In this talk, I will survey several variations of such grid-covering problems where recent progress has been made. These variations and the new results are intertwined with coding theory.

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