## DIMENSION-FREE ESTIMATES FOR MAXIMAL FUNCTIONS OVER CONVEX BODIES; FROM THE CONTINUOUS TO A DISCRETE SETTING.

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The topic of dimension-free  $L^p$  estimates for Hardy–Littlewood maximal functions over convex bodies in  $\mathbb{R}^d$  had been mainly developed in the 80' and 90' in the work of Stein, Bourgain, Carbery, and Müller. The interest in the topic has been recently renewed due to recent progress by Aldaz 2011 and Bourgain 2014. However, up to now, nothing has been done in the discrete context, i.e. when  $\mathbb{R}^d$  is replaced by  $\mathbb{Z}^d$ .

In this talk we present first dimension-free results for discrete Hardy–Littlewood maximal functions. First we give an example showing that the phenomenon is not as robust as in the continuous case. Then we focus on the case of the discrete cube. New estimates for the Fourier transform of the characteristic function of the discrete cube are crucial to our work. An important ingredient of our approach are also the methods developed in our previous work, where we proved dimension-free estimates for *r*-variations of Hardy–Littlewood averaging operators on  $\mathbb{R}^d$ .

The talk is based on joint work with J. Bourgain, M. Mirek, and E.M. Stein.