



Der Wissenschaftsfonds.



**JKU**  
JOHANNES KEPLER  
UNIVERSITÄT LINZ

## Einladung

zum Vortrag im Rahmen des **SFB Colloquiums** (Standort Linz), mit dem Titel

# Small ball inequality and low discrepancy constructions

VORTRAGENDER: **Prof. Dmitriy Bilyk**, University of Minnesota

DATUM: Dienstag, 23. Juni 2015

ZEIT: 10:30 Uhr

ORT: Science Park 3, S3 057, JKU Linz

### Abstract:

The so-called “small ball inequality” is a lower bound for the sup-norm of “hyperbolic” linear combinations of multiparameter Haar functions (or other wavelets). It bears resemblance to the classical Sidon theorem on lacunary Fourier series, and is closely connected to some questions in probability and approximation theory. A few years ago, it was discovered that this inequality is also related to discrepancy theory. Although the relation was only heuristic, it gave way to a significant improvement on the lower bounds of the sup-norm of the discrepancy function in higher dimensions. In recent joint work with N. Feldheim we have found some new proofs of the two-dimensional version of this inequality, which have revealed a new (and this time formal) connection between the small ball inequality and discrepancy theory: the extremal sets arising in the inequality are precisely the binary nets: sets with of  $N = 2^n$  points, which are perfectly distributed with respect to dyadic rectangles, i.e. every binary box of volume  $1/N$  contains exactly one point. Conversely, every binary net can be obtained in such a way. We shall survey recent and older results on this topic, and indicate some approaches to the higher-dimensional problems.