

## Mathematical Colloquia

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**Monday, 06 May 2024**

17:15 h, lecture room B6 (ExWi)

**Prof. Dr. Karoly Boroczky, Rényi Institute of Mathematics, Budapest**

### **Sphere packings in dimensions 8 and 24 - at the crossroad of geometry, number theory and Fourier analysis**

**Abstract :** The problem of dense packings of equal spheres in  $\mathbb{R}^n$  - a problem arising in number theory and geometry - goes back to Kepler, Lagrange and Gauss, still the optimal density is only known in dimensions  $n=2,3,8,24$ . Our main focus is the cases  $n=8,24$  where the  $E_8$  lattice and the Leech lattice are optimal. We sketch history, and how a little lemma in Fourier analysis set up the scene to Maryna Viazovska's groundbreaking results using modular forms. At the end, the structure of the close to optimal packings is described in dimensions 8 and 24, a joint result with Joao Ramos and Danylo Radchenko.