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*Lattice theta function and ionic crystal: a proof of Born's conjecture*

In his paper "Über elektrostatische Gitterpotentiale", published in 1921, Max Born asked the following question related to ionic crystals: "How to arrange positive and negative charges on a simple cubic lattice of finite extent so that the electrostatic energy is minimal?". He conjectured that the alternation of charges  $+1$  and  $-1$  is optimal distribution of charges.

In this talk, I will explain a connection between the translated lattice theta function and the optimal configuration of charges on a given lattice, when the interaction potential is completely monotone. Thus, a proof of Born's conjecture in any dimension, for orthorhombic lattices, will be given. Finally, we will see that the solution for the triangular lattice exhibits a surprising honeycomb structure. This talk is based on joint works with Hans Knüpfer (University of Heidelberg) and Mircea Petrache (PUC Chile).