Lorentzian polynomials and matroids over triangular hyperfield

Oliver Lorscheid¹

 1 (Groningen, Netherlands)

Abstract: In this talk, I report on a joint project with Matt Baker, June Huh and Mario Kummer in which we identify Lorentzian polynomials with matroids over triangular hyperfields. This leads to a description of the space of Lorentzian polynomials in terms of the moduli space of matroids, which in turn yields explicit descriptions of the fomer space in many cases.

In this talk, we give brief (and accessible!) introductions to Lorentzian polynomials (as introduced by Branden-Huh as a mean to streamline and simplify a series of proofs of long open conjectures in combinatorics), triangular hyperfields (following Viro's approach to tropical geometry), matroids over hyperfields (a.k.a. Baker-Bowler theory) and Grassmannians as moduli spaces of matroids (following my joint work with Baker). Then we turn to the intricate relationship between these different theories and delve into the implications on the geometry of the spaces of Lorentzian polynomials and Grassmannians over triangular hyperfields.