Andrew Lane
University of Passau

On the factorization of Dirac hypergraphs

A celebrated result from the 70s due to Baranyai states that the complete k-uniform hypergraph on n vertices decomposes into perfect matchings if $k \mid n$. We prove a minimum degree version of this result. Note that a necessary condition for a k-uniform hypergraph G on n vertices to admit a decomposition into perfect matchings is that G is vertex-regular and $k \mid n$. We show that, if this is satisfied and in addition G has minimum $(k-1)$-degree at least $(\frac{1}{2} + o(1))n$, then it indeed decomposes into perfect matchings. The constant $1/2$ is best possible, as below this threshold, G might not even contain a single perfect matching. This settles a conjecture of Glock, Kühn, and Osthus from 2021.

This is joint work with Yangyang Cheng and Stefan Glock.