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Gibbs measures on the Young graph with the Macdonald multiplicities and Kerov's conjecture.

I would like to briefly talk about the recent proof of the Kerov's conjecture (1992) classifying the homomorphisms from the algebra of symmetric functions to reals with non-negative values on the Macdonald functions. This allows to classify Gibbs measures on the Young branching graph with the Macdonald multiplicities. For the special case of the Schur functions this is equivalent to classifying totally non-negative infinite Toeplitz matrices, and the result was first proved by Schoenberg, Edrei, et.al. in the beginning of the 1950s. Their motivation came from Analysis, but in the 1960s Thoma has discovered a connection with the representation theory of the infinite symmetric group. Some other special cases of the Kerov's conjecture are also connected to asymptotic representation theory. Our proof is a combination of two methods. 1). Developing in the Macdonald generality the "pole elimination" argument developed for the Schur case by Schoenberg. 2). A new method based on showing certain diffusivity in the branching graph of the Macdonald functions.