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Combinatorics of the ASEP on a ring and Macdonald polynomials.

The multispecies asymmetric simple exclusion process (ASEP) is a model of hopping particles of M different types hopping on a one-dimensional lattice of N sites. In this talk, we consider the ASEP on a ring with the following dynamics: particles at adjacent sites can swap places with either rate 1 or t depending on their relative types. Recently, James Martin gave a combinatorial formula for the stationary probabilities of the ASEP with generalized *multiline queues*. It turns out that by introducing additional statistics on the multiline queues, we get a new formula for both symmetric Macdonald polynomials P_λ and nonsymmetric Macdonald polynomials E_λ , where λ is a partition. This talk is based on joint work with Sylvie Corteel (Université Paris-Diderot) and Lauren Williams (Harvard). (Received January 28, 2019)