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Positivity properties for the lowest summand of the asymptotic Hecke algebra

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Affine Hecke algebras play a prominent role in the representation theory of a p-adic group G, with the principal Bernstein block being equivalent to modules over the Iwahori-Hecke algebra. Braverman-Kazhdan proposed Lusztig's asymptotic Hecke algebra J as means to an algebraic version of tempered representations for the principal block. In particular, elements of J are certain rapidly-decaying functions on $G(F)$.

I will explain positivity properties, as conjectured by Braverman-Kazhdan, for two bases of the best understood part of the ring J, in terms of K-theory of the flag variety of $\hat{G}$ and spherical Kazhdan-Lusztig polynomials for G, and report on joint work
in progress with Bezrukavnikov to give an asymptotic characterization of these functions in terms of the wonderful compactification of G. Time permitting, I will explain partial results on positivity properties for two-sided cells corresponding to Levi subgroups of the general linear group with one block size.

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