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Non-crossing and Non-nesting polytopes

N. Thieme defined unipotent polytopes in connection to certain representations of the unipotent group of upper triangular matrices over a finite field. In this talk we will define two subpolytopes of the unipotent polytope $U(\beta, P)$ where P is the line poset on n and β is the composition (1^n) . These two subpolytopes arise as the convex hull of non-crossing and non-nesting partitions of $[n]$, respectively. We will explore the combinatorics of these polytopes and their connection with the root lattice of type A. This is current work with N. Bergeron, L. Colmenarejo and F. Saliola.