Pieces of nilpotent cones for classical groups
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The algebraic groups $SO_{2n+1}$ and $Sp_{2n}$ have dual root data, so one expects there to be close connections between them. However, the nilpotent orbits of $SO_{2n+1}$ in its Lie algebra seem superficially different from those of $Sp_{2n}$. Lusztig observed that on each side the orbits can be lumped together into ‘special pieces’ which correspond more closely. For example, the number of points defined over a finite field in each special piece for $SO_{2n+1}$ is the same as that in the corresponding special piece for $Sp_{2n}$, as Lusztig showed by direct computation. I will explain a new approach to this phenomenon, in which the two nilpotent cones are related via the exotic nilpotent cone of S. Kato. This is joint work with P. Achar (Louisiana State University) and E. Sommers (University of Massachusetts).