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*The orbit philosophy for Spin groups*

Let  $G$  be a semisimple Lie group with Lie algebra  $\mathfrak{g}$  and maximal compact subgroup  $K$ . The philosophy of coadjoint orbits suggests a way to study unitary representations of  $G$  by their close relations to the coadjoint  $G$ -orbits on  $\mathfrak{g}^*$ . In this talk, we study a special part of the orbit philosophy. We provide a comparison between the  $K$ -structure of unipotent representations and regular functions of bundles on nilpotent orbits for complex and real groups of type  $D$ . More precisely, we provide a list of genuine unipotent representations for a Spin group; separately we compute the  $K$ -spectra of the regular functions on certain small nilpotent orbits, and then match them with the  $K$ -types of the genuine unipotent representations. This is joint work with Dan Barbasch.