Spherical convex hull of random points on a wedge

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Consider a convex body $K \subset \mathbb{R}^d$ and let $X_1, \dots, X_n$ be i.i.d. points uniformly distributed in K. Denote by K_n a random polytope, constructed as a convex hull of points $X_1, \dots, X_n$. It is one of the classical models of random polytope, which has been intensively studied during the last years. One of the first natural questions is to determine the asymptotics of the average number of k-faces of K_n as $n \to \infty$. In $\mathbb{R}^d$ this problem is solved (up to certain extend).

In this talk we consider a spherical analogue of the above construction. More precisely we will deal with the special type of spherical convex bodies, which include two antipodal points. More precisely consider two half-spaces H_1^+ and H_2^+ in $\mathbb{R}^{d+1}$ whose bounding hyperplanes H_1 and H_2 are orthogonal and pass through the origin. The intersection $\mathbb{S}^d_{2,+} := \mathbb{S}^d \cap H_1^+ \cap H_2^+$ is a spherical convex subset of the d-dimensional unit sphere $\mathbb{S}^d$, which contains a great subsphere of dimension $d-2$ and is called a spherical wedge. Choose n independent random points uniformly at random on $\mathbb{S}^d_{2,+}$ and consider the expected facet number of the spherical convex hull of these points. We will shown that, up to terms of lower order, this expectation grows like a constant multiple of $\log n$. At the end of the talk we will compared this result to the corresponding behaviour of classical Euclidean random polytopes and of spherical random polytopes on a half-sphere.