1117-42-436 **Dmitriy Bilyk*** (dbilyk@math.umn.edu) and **Michael Lacey**. *Tessellations of the sphere, one-bit sensing, restricted isometries, and discrepancy.*

We investigate the question of uniform tessellations of the sphere by hyperplanes, in other words, the problem asking under which conditions the map

$$x \to \{\operatorname{sgn} \langle x, z_j \rangle\}_{j=1}^N, \;\; x \in \mathbb{S}^d$$

where z_j are (random or deterministic) unit vectors, has the δ-RIP (restricted isometry property) from the sphere (or its subset) into the Hamming cube. Such questions are central to the so-called one-bit compressed sensing. We exploit ideas from empirical processes and discrepancy theory to address these questions. We show that in the random case the optimal number of hyperplanes is $N \approx d\delta^{-2}$, while generally there is a dimensional correction $N \approx \delta^{-2+\frac{2}{d+1}}$. We explore a number of other questions: the case of sparse vectors, small cell properties, connections to tight frames, etc. (Received January 18, 2016)