1120-42-137 **John Isaac Haas*** (haasji@missouri.edu). *Tight orthoplectic Grassmannian frames.*

A (complex) Grassmannian frame is a spanning set of N unit vectors for $\mathbb{C}^M$ whose maximal magnitude among pairwise inner products is minimal. Grassmannian frames are useful in many applications, but few methods for constructing them are known. Moreover, most known constructions produce equiangular tight frames (ETFs). While ETFs are arguably the most important class of Grassmannian frames, their minimizing property corresponds to saturation of the Welch bound, which is only feasible when $N \leq M^2$.

In this talk, we turn our attention to the case $N > M^2$, where the lesser known orthoplex bound is stronger than the Welch bound. By generalizing a known construction of ETFs based on Singer sets, we develop families of complex Grassmannian frames whose maximal magnitude among pairwise inner products equals the orthoplex bound, which we call orthoplectic Grassmannian frames (OGFs). In particular, whenever $M-1$ is a prime power, we obtain tight OGFs of $N = M^2+1$ vectors and whenever M is a prime power, we obtain tight OGFs of $N = M^2+M-1$ vectors. Furthermore, along with ETFs and mutually unbiased bases, we show that OGFs form weighted complex projective 2-designs and are thus useful additions to quantum state tomography. (Received February 18, 2016)