1172-15-245 **Dustin G. Mixon*** (mixon.23@osu.edu). *Tight projective 2-designs.*

We consider tight projective 2-designs in three different settings. In the complex setting, Zauner's conjecture predicts the existence of a tight projective 2-design in every dimension. Pandey, Paulsen, Prakash, and Rahaman recently proposed an approach to make quantitative progress on this conjecture in terms of the entanglement breaking rank of a certain quantum channel. We show that this quantity is equal to the size of the smallest weighted projective 2-design. Next, in the finite field setting, we introduce a notion of projective 2-designs, we characterize when such projective 2-designs are tight, and we provide a construction of such objects. Finally, in the quaternionic setting, we show that every tight projective 2-design for $\mathbb{H}^d$ determines an equi-isoclinic tight fusion frame of $d(2d-1)$ subspaces of $\mathbb{R}^{d(2d+1)}$ of dimension 3. (Joint work with Joey Iverson and Emily King.) (Received August 30, 2021)