Equiangular tight frames from nonabelian groups.

Several applications in signal processing require lines through the origin of a finite-dimensional Hilbert space with the property that the smallest interior angle is as large as possible. Packings that achieve equality in the Welch bound are known as equiangular tight frames (ETFs). Since optimal packings often exhibit symmetry, it is natural to expect such packings to be related to groups. Indeed, a popular type of ETFs are the so-called harmonic ETFs, that is, ETFs that arise from the action of an abelian group on a single vector. On the other hand, perhaps the most famous open problem in this area is Zauner’s conjecture, which asks for an ETF from the action of the Heisenberg group, which is nonabelian. The theory of harmonic ETFs is fairly well understood as it is equivalent to well-studied objects known as difference sets. The theory of ETFs generated by nonabelian groups is much more mysterious. In this talk we will discuss this theory and present a construction of the first infinite family of ETFs arising from nonabelian groups. (Received July 16, 2019)