1094-42-68 **Matthew Fickus*** (matthew.fickus@gmail.com), Department of Mathematics and Statistics, Air Force Institute of Technology, Wright-Patterson AFB, OH 45433. *Equiangular Tight Frames and the Restricted Isometry Property.*

An equiangular tight frame (ETF) is a type of optimal packing of a given number of lines in a Euclidean space of a given dimension. Such frames have minimal coherence, making them attractive for compressed sensing (CS) applications. However, like all known deterministic constructions of matrices, ETFs suffer from the "square-root bottleneck," meaning the degree to which they satisfy CS's restricted isometry property (RIP) pales in comparison to random matrices. For most deterministic constructions, it is unknown whether this bottleneck is simply a consequence of poor proof techniques or, more seriously, a flaw in the matrix design itself. We focus on this issue in the special case of ETFs. In particular, we discuss the degree to which the recently-introduced Steiner and Kirkman ETFs satisfy the RIP. We further discuss how a popular family of ETFs, namely harmonic ETFs arising from McFarland difference sets, are particular examples of Kirkman ETFs. Overall, we find that many families of ETFs are shockingly bad when it comes to RIP, being provably incapable of exceeding the square-root bottleneck. (Received August 08, 2013)