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Marcus Appleby, University of Sydney, **Steven Flammia***, University of Sydney, **Gary McConnell**, Imperial College London, and **Jon Yard**, University of Waterloo. *Zauner's Conjecture and Algebraic Number Theory.*

Zauner's conjecture asks whether d^2 complex equiangular lines exist in every d -dimensional complex vector space, a number which saturates known upper bounds. Such a set of lines is known in the quantum information literature as a SIC. In this talk, we will discuss a substantial strengthening of Zauner's conjecture that makes surprising connections to explicit algebraic number theory. In particular, every known SIC family yields explicit unit generators for specific ray class fields of a real quadratic number field. The examples in low dimensions suggest a general recipe for producing unit generators in infinite towers of ray class fields above arbitrary real quadratic number fields, and we summarize this in a conjecture. arXiv:1604.06098. (Received January 22, 2018)