1145-11-633 **David P. Roberts*** (roberts@morris.umn.edu), Division of Science and Mathematics, University of Minnesota Morris, Morris, MN 56267. *Quadratic relations between Feynman integrals.*

The theory of periods in arithmetic geometry provides a general framework for understanding the transcendence properties of a broad class of integrals. A genus g curve over $\mathbf{Q}$ gives a classical instance of this theory. It has a $2g$-by-$2g$ matrix of periods P. While the entries of this matrix are expected to be transcendental numbers, they satisfy quadratic relations of the form

$$PDP^t = B.$$

Here D and P are antisymmetric matrices with rational entries, coming from "de Rham" and "Betti" cohomology respectively.

The talk will explain how integrals arising in quantum field theory conjecturally also fit into this framework. The integrals in question are moments of classical Bessel functions,

$$\int_0^\infty I_0^a K_0^b t^c dt.$$

We explain how we were led to package these integrals into an infinite sequence of square matrices P_k, and how we found explicit formulas for associated rational-entry matrices D_k and B_k so that conjecturally $P_k D_k P_k^t = B_k$ always holds.

The talk will be accessible to undergraduates, but will also give brief indications of deeper number-theoretic content, such as connections with special values of L-functions. This is joint work with David Broadhurst. (Received September 11, 2018)