Unitary Groups of Hermitian Forms

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Abstract: If V is a K-vector space of finite dimension, where K is the real or complex field or the skew-field of quaternions, then every nondegenerate hermitian form of signature (p,q) on V induces an associated unitary group: namely, all endomorphisms of V that leave the form invariant. There is also a smooth manifold S(p,q,k) associated with the form; when p=n, q=0, and K=R, this manifold is the usual (n-1)-sphere. In this lecture I will discuss joint work with C. Ramsey (Waterloo) in which we have computed the first and second homotopy groups of these unitary groups and pseudospheres. If time permits, I will also discuss topological and classification questions concerning the orbits of the inner automorphisms of End(V) affiliated with unitaries.