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Adiabatic stability of Fermi surfaces and K-theory

I will present a classification of Fermi surfaces of non-interacting, discrete translation-invariant systems from electronic band theory, adiabatic evolution and their topological interpretations. For systems on a half-space and with a gapped bulk, this derivation naturally yields a K-theory classification. Given the $d-1$-dimensional surface Brillouin zone X_s of a d-dimensional half-space, this result implies that different classes of globally stable Fermi surfaces belong in $K^{-1}(X_s)$. I will also mention how to include symmetries through equivariant methods. This is based on joint work with A.Adem, O.Antolín-Camarena and G.W. Semenoff.