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Periodic point interactions on a Riemannian manifold

Let X be a complete n-dimensional Riemannian manifold on which a group Γ acts isometrically, effectively, and properly discontinuously with compact $\Gamma \setminus X$. For a Γ-periodic, self-adjoint elliptic operator A_0 of order $m > n/2$ in $L^2(X)$, we consider a Γ-periodic point perturbation A of A_0. It is proved that the gaps of the spectrum $\sigma(A)$ are labelled in a natural way by elements of the K_0-group of a certain C^*-algebra. In particular, if this algebra has the Kadison property, then $\sigma(A)$ has band structure. Part of these results is obtained jointly with J. Brüning.