CHARACTERIZATION OF THE POTENTIAL SMOOTHNESS OF ONE-DIMENSIONAL DIRAC OPERATOR AND ITS RIESZ BASIS PROPERTY

The one-dimensional Dirac operators with periodic potentials subject to periodic, antiperiodic and Dirichlet boundary conditions have discrete spectrums. It is known that, for large enough $|n|$ in the disc centered at n of radius $1/4$, the operator has exactly two eigenvalues (λ_n^+ and λ_n^-) which are periodic (for even n) or antiperiodic (for odd n) and one Dirichlet eigenvalue μ_n. These eigenvalues construct a deviation $|\lambda_n^+ - \lambda_n^-| + |\lambda_n^+ - \mu_n|$. The talk will be about characterisation of smoothness of the potential by the decay rate of this spectral deviation. Furthermore, the Dirac operator with periodic or antiperiodic boundary condition has the Riesz basis property if and only if the absolute value of the ratio $\frac{|\lambda_n^+ - \mu_n|}{|\lambda_n^+ - \lambda_n^-|}$ of these deviations is bounded. A general boundary condition will be introduced that gives the same characterisation for smoothness and the Riesz basis property.