SZEGŐ-TYPE INEQUALITY FOR THE 2-D DIRAC OPERATOR WITH INFINITE MASS BOUNDARY CONDITIONS

VLADIMIR LOTOREICHIK

NUCLEAR PHYSICS INSTITUTE
CZECH ACADEMY OF SCIENCES

In this talk, we will discuss spectral features of the Dirac operator with infinite mass boundary conditions in a smooth bounded domain of $\mathbb{R}^2$. Motivated by spectral geometric inequalities, we derive a non-linear variational formulation to characterize its principal eigenvalue. This characterization turns out to be very robust and allows for a simple proof of a Szegő type inequality as well as a new reformulation of a Faber-Krahn type inequality for this operator. We will also present strong numerical evidence supporting the validity of a Faber-Krahn type inequality.

This talk is based on a joint work with Pedro Antunes, Rafael Benguria, and Thomas Ourmières-Bonafos.