WEYL-TITCHMARSH-KODAIRA THEORY FOR SCHRÖDINGER OPERATORS WITH STRONGLY SINGULAR POTENTIALS

Aleksey Kostenko
University of Vienna

Our main aim is to develop Weyl-Titchmarsh-Kodaira theory for Schrödinger operators with strongly singular potentials such as perturbed spherical Schrödinger operators (also known as Bessel operators). It is known that in such situations one can still define a corresponding singular Weyl m-function and it was recently shown that there is also an associated spectral transformation. In this talk we will give a general criterion when the singular Weyl function can be analytically extended to the upper half plane. We will derive an integral representation for this singular Weyl function and give a criterion when it is a generalized Nevanlinna function. Our criteria will in particular cover the aforementioned case of perturbed spherical Schrödinger operators. Moreover, we will show how essential supports for the Lebesgue decomposition of the spectral measure can be obtained from the boundary behavior of the singular Weyl function. Finally, we will present a local Borg-Marchenko type uniqueness result.