Inverse Spectral Problems for Bessel Operators

R. Hryniv
joint work with S. Albeverio and Ya. Mykytyuk

We study the direct and inverse spectral problems for Bessel operators on $(0,1)$ given by the differential expression

$$Sy(x) = -y''(x) + \frac{l(l+1)}{x^2}y(x) + q(x)y(x),$$

and subject to suitable boundary conditions at the point $x = 1$. Here $l \in \mathbb{Z}_+$ is an *angular momentum* and $q \in W_2^{-1}(0,1)$ is a distributional potential. We give a complete description of possible spectra for such operators and solve the inverse problem of reconstructing l and q from the spectral data (two spectra or one spectrum and the corresponding norming constants).