High- and low- energy analysis and Levinson's theorem for the selfadjoint matrix Schrödinger operator on the half line

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The matrix Schrödinger equation with a selfadjoint matrix potential is considered on the half line with the general selfadjoint boundary condition at the origin. When the matrix potential is integrable, the high-energy asymptotics are established for the related Jost matrix, the inverse of the Jost matrix, and the scattering matrix. Under the additional assumption that the matrix potential has a first moment, it is shown that the scattering matrix is continuous at zero energy. An explicit formula is provided for the scattering matrix at zero energy. The small-energy asymptotics are established also for the related Jost matrix, its inverse, and various other quantities relevant to the corresponding direct and inverse scattering problems. Furthermore, Levinson's theorem is derived, relating the number of bound states to the change in the argument of the determinant of the scattering matrix.

The talk is based on a joint work with T. Aktosun and M. Klaus.

References

[1] T. Aktosun, M. Klaus, R. Weder, Small-energy analysis for the selfadjoint matrix Schrödinger operator on the half Line, J. Math. Phys. **52** (2011) 102101, 24 pp.

[2] T. Aktosun, R. Weder, High-energy analysis and Levinson's theorem for the selfadjoint matrix Schrödinger operator on the half line, arXiv:1206.2986v1 [math-ph], 50 pp.