Since the beginning of the twentieth century, Spectral Theory has been the subject of constant development and has found more and more applications. Apart from its own richness and from giving rise to a variety of new mathematical concepts, Spectral Theory is a pillar of various branches of Mathematics such as: Partial Differential Equations, Functional Analysis, Operator Algebras, and Non-commutative Geometry. In Physics, no doubt about it, one of the most striking successes of Spectral Theory has been the development of Quantum Mechanics and Quantum Field theory, two subjects whose formalisms and methods are built on this theory. Spectral theory plays an important role in many other applications of Partial Differential Equations, such as the method of layer potentials.

The interest in Spectral Theory has not faded over the years. Recently, the spectral analysis of operators arising from Quantum Mechanics and Quantum Field Theory has attracted a lot of attention in the Mathematical Physics community. In particular, the following directions of research connected to Spectral Theory have recently been studied, as illustrated, in particular, by the papers in this topical issue:

- The structure of the spectrum of Quantum Hamiltonians [4,14,15].
- Quantum Field Theory on curved space times and quantization in infinite dimensional settings [8,9,13].
- Spectral theory on graphs and the study of quantum walks [6].
- Magnetic hamiltonians and algebraic methods [7,11,15].
- The location of the essential spectrum and the absence of embedded eigenvalues or of the singular continuous spectrum [5,12,16,18].
- The analysis of partial differential operators on singular or non-compact spaces [1,2] (the spectral theory of partial differential operators and the

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localization of the eigenfunctions in domains with corners has been especially active) [3,10,17].

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REFERENCES


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