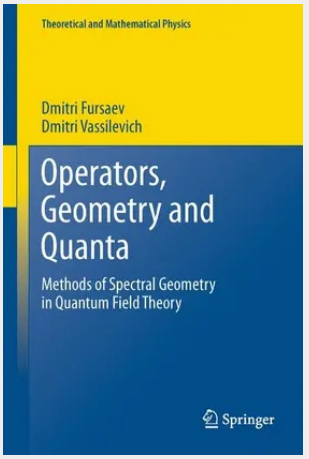
Fursaev / Vassilevich

Operators, Geometry and Quanta

Methods of Spectral Geometry in Quantum Field Theory



This book gives a detailed and self-contained introduction into the theory of spectral functions, with an emphasis on their applications to quantum field theory. All methods are illustrated with applications to specific physical problems from the forefront of current research, such as finite-temperature field theory, D-branes, quantum solitons and noncommutativity. In the first part of the book, necessary background information on differential geometry and quantization, including less standard material, is collected. The second part of the book contains a detailed description of main spectral functions and methods of their calculation. In the third part, the theory is applied to several examples (D-branes, quantum solitons, anomalies, noncommutativity). This book addresses advanced graduate students and researchers in mathematical physics with basic knowledge of quantum field theory and differential geometry. The aim is to prepare readers to use spectral functions in their own research, in particular in relation to heat kernels and zeta functions.

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