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Spectroscopy of lattice gauge theories from spectral densities

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We critically discuss the algorithmic process of estimating spectral densities using the Hansen-Lupo-Tantalo method. A novel approach at finite volume is deployed to extract the spectrum of lattice gauge theories. As a case study, our discussion takes as an example the study of beyond-Standard-Model (BSM) symplectic gauge theories with matter field consisting of a mixed fermion representation—fundamental and two-index antisymmetric one. We discuss potential sources of systematic effects. The results obtained with the spectral densities are critically compared with conventional data analysis techniques, vastly used in lattice QCD and BSM, such as the generalised eigenvalue problem. It will be also stressed how this algorithm and code can be applied to both QCD and BSM theories on a lattice.

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