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Beyond the Parity and Bloch Theorem: A Systematic Pathway to the Breaking of Discrete Symmetries

The concept of local symmetries which hold only in spatially limited domains is developed. Decomposing space into domains where different local symmetries hold a novel layer of complexity is derived. This way the parity and Bloch theorems are generalized to the case of broken global symmetry. Local inversion or translation symmetries are shown to yield invariant currents that characterize wave propagation. These currents map the wave function from an arbitrary spatial domain to any symmetry-related domain. Our approach addresses any combination of local symmetries, thus applying in particular to acoustic, optical and matter waves. Nonvanishing values of the invariant currents provide a systematic pathway to the breaking of discrete global symmetries. As examples of application we provide a classification of perfectly transmitting resonances in completely locally symmetric scattering setups. This includes sum rules on the invariant currents that provide resonance conditions.

References

P.A. Kalozoumis, C. Morfonios, F.K. Diakonos and P. Schmelcher, Phys. Rev. A 87, 032113 (2013)

P.A. Kalozoumis, C. Morfonios, N. Palaiodimopoulos, F.K. Diakonos and P. Schmelcher Phys. Rev. A 88, 033857 (2013)

P.A. Kalozoumis, C. Morfonios, F.K. Diakonos and P. Schmelcher, Phys. Rev. Lett. 113, 050403 (2014)

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