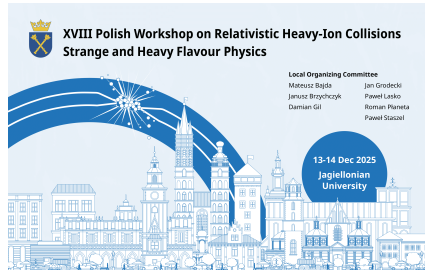


XVIII Polish Workshop on Relativistic Heavy-Ion Collisions: Strange and Heavy Flavour Physics



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Glueballs in the Hopfion approach

Sunday 14 December 2025 11:40 (25 minutes)

We work out the Hopfion description of glueballs by inclusively comparing the energy spectra obtained by quantizing Hopfions with experimental data and lattice QCD. Identifying a Hopfion carrying a unit topological charge as $f_0(1500)$, the Hopfions with the topological charge two are classified as glueballonia, i.e., two glueballs are bound together. We find a tightly and a loosely bound glueballonia complying with $f_0(2470)$ and a novel scalar particle carrying the mass around 2814 MeV, respectively, and calculate their binding energies. By the rigid body quantization of Hopfions, we predict a characteristic multiplet structure of tensor glueball states. Some of them are missing in the current experimental data and can be verified in future measurements.

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