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Bloch's Theorem and The Lattice Gluon Propagator

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Content

Exploiting the similarity between Bloch's theorem for electrons in crystalline solids and the problem of Landau gauge-fixing in Yang-Mills theory on a "replicated" lattice allows one to obtain essentially infinite-volume results from numerical simulations performed on regular-size lattices. We review our study of the method applied to the gluon propagator and propose a novel interpretation, which might improve our understanding of color confinement. In particular, we show how to map numerical simulations performed on the "replicated" lattice onto the original (smaller), lattice, or "unit cell". Special emphasis is given to the rôle played by boundary conditions.

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