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Open Lattice Field Theory

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The paradigm of effective field theory is one of the most powerful tools available in physics. While most commonly employed in parametrizing renormalization group flow, it is also of great utility in describing dispersive systems such as $K_0 - \bar{K}_0$ states that both oscillate and decay. Of particular interest for the lattice community is the study of field theories off the real axis of coupling constants. This is important for behavior at finite chemical potential as well as in the study of critical phenomena more generally. These models can exhibit a rich phenomenology, such as non-unitary critical points and steady-state attractors. We describe a mapping of an arbitrary dispersive bosonic lattice effective theory onto a class of unitary system + environment models that are amenable to simulation on quantum machinery, and discuss how certain aspects can be studied even on near-term noisy hardware.

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