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**Solid-state quantum metamaterials** RICHARD WILSON, MARK EVERITT, SERGEY SAVELIEV, ALEXANDRE ZAGOSKIN, Department of Physics, Loughborough University — Quantum metamaterials provide a promising potential test bed for probing the quantum-classical transition. We propose a scalable and feasible architecture for a solid-state quantum metamaterial. This consists of an ensemble of superconducting flux qubits inductively coupled to a superconducting transmission line. We make use of fully quantum mechanical models which account for decoherence, input and readout to study the behaviour of prototypical 1D and 2D quantum metamaterials. In addition to demonstrating some of the novel phenomena that arise in these systems, such as “quantum birefringence,” we will also discuss potential applications.

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