

Abstract Submitted
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Supersymmetric sigma model of disordered, isotropic, elastic media¹ DOUGLAS PHOTIADIS, Naval Research Laboratory — The supersymmetry method proposed by Efetov in 1983 has been enormously successful at describing a broad range of phenomena involving disorder, providing a framework for understanding and going beyond the successes of random matrix theory and allowing a calculation of the slowing of diffusion as the Anderson transition is approached. The original model described the propagation of a scalar wave in a disordered medium, and subsequent work extended these ideas to classical waves, optical or elastic, with the approximation that the wave propagation can be similarly described by a scalar theory. Such a theory cannot however account correctly for scattering between different polarizations. A direct attempt to derive a supersymmetric model describing elastic waves results in a non-renormalizable field theory, and poses substantial difficulties. We have obtained a supersymmetric sigma model by considering the dual model which describes a generalized superstress field. The model enables one to fully account for the different wave types and polarizations in the medium. We will present our recent results in this area, including model predictions for the obtained diffusion constants, and the effects of renormalization to first order.

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