

Infrared catastrophe in two-dimensional quantum antiferromagnets: spectral damping without quasiparticle decay.

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We consider two-dimensional quantum antiferromagnets in disordered phases. The disorder can be due to a finite temperature or due to the quantum Lifshitz criticality. In these situations quasiparticles have very long or even infinite lifetime. We demonstrate that in spite of very long lifetime of quasiparticles such systems manifest a broad non-Lorentzian frequency response to a physical probe. This analysis forms the basis for a new paradigm describing the interaction of experimental probes with a physical system, where broadening is due neither to the lifetime, nor to the emergence of fractional quasiparticles. Instead, strong fluctuations drive the probe to absorb and radiate an infinite number of arbitrarily low energy quasiparticles, leading us to draw parallels with the infrared catastrophe in quantum electrodynamics.

Level of Expertise

Expert

Speakers Gender

Male

Do you wish to take part in the poster slam

No

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