



Harvard **Quantum** Initiative  
IN SCIENCE AND ENGINEERING

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# Quantum Colloquium

**Thursday, April 25, 2024, 11:00am**  
**60 Oxford St., Room 301**

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## Professor Eugene Demler

Department of Physics, ETH Zurich

**“Illuminating Electron Correlations”**

Developments in optical technology bring new modalities of probing electron systems. This talk will review several examples of the correlated states revealed by novel optical probes with an emphasis on the theoretical models necessary for interpreting experimental results. We will start by discussing recent experiments in the pseudogap phase of the high  $T_c$  cuprates that have been interpreted as the light induced Meissner effect. We will approach this phenomenon from the perspective of nonlinear dynamics of the sine-Gordon model triggered by the strong terahertz pump pulse. This interpretation suggests that these experiments reveal strong superconducting correlations in the pseudogap state but do not require photoinduced superconductivity. We will also discuss sensitive light reflection experiments in layered materials used as probes of electronic states. Examples include the observation of the mixed state between an electronic Wigner crystal with an electron liquid as well as the demonstration of a new type of magnetism in moire systems.

**Guest presentation will begin promptly at 11:00am.**