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Title: The quantum light bulb -- how to generate quantum electromagnetic field with a normal conductor

Abstract:

- > Electrons in conductors have a disordered motion which cause random
- > fluctuations of the electrical current, a phenomenon commonly referred
- > to as "noise". In classical physics, the variance of these
- > fluctuations is simply proportional to the temperature. In a tiny
- > device placed at very low temperature, electrons can no longer be
- > considered as classical particles: quantum mechanics dictates their
- > behavior. We will describe very recent experiments that highlight how
- > such a quantum current may generate a quantum electromagnetic field.
- > In particular, we will demonstrate the existence of squeezing (i.e.,
- > the ability to shrink fluctuations below that of vacuum) and emission
- > of pairs of entangled photons, a key property for the use of light for
- > quantum information science.
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