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标题: Power-law dependence of the optical conductivity observed in the quantum spin-liquid compound kappa-(BEDT-TTF)(2)Cu-2(CN)(3)
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摘要: The Mott-insulator kappa-(BEDT-TTF)(2)Cu-2(CN)(3) is the prime candidate of a quantum spin-liquid with puzzling magnetic properties. Our terahertz and infrared investigations reveal that also the charge dynamics does not follow the expectations for a Mott insulator. We observe a large in-gap absorption where the excess conductivity exhibits a power-law behavior sigma(exc)(1)(omega) proportional to omega(n) that grows stronger as the temperature decreases and extends all the way through the far infrared. With n approximate to 0.8 to 1.5, the exponent is significantly smaller than predicted by Ng and Lee [T.-K. Ng and P. A. Lee, Phys. Rev. Lett. 99, 156402 (2007)] for spinon contributions to the optical conductivity. We suggest fluctuations become important in the spin-liquid state and couple to the electrodynamic properties differently compared to the antiferromagnetic Mott insulator kappa-(BEDT-TTF)(2)Cu[N(CN)(2)]Cl. We discuss the various possibilities of how charge fluctuations are influenced by the presence or absence of magnetic order.
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