

Abstract Submitted
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Onsager rule, quantum oscillation frequencies, and the density of states in the mixed-vortex state of cuprates ZHIQIANG WANG, SUDIP CHAKRAVARTY, UCLA — Onsager rule that determines the frequencies of quantum oscillations in high magnetic fields serves as an anchor point. In its absence it would be very difficult to interpret the experimental results, because for each instance the problem would have to be considered anew. In the mixed-vortex state of the underdoped cuprates where, major consequential discoveries have recently taken place, its validity has been recently questioned. Here we show that this rule remains intact to an excellent approximation. The models we consider are fairly general, consisting of a variety of density wave states combined with d -wave superconductivity. Another exceptionally interesting result from our model calculations is that the oscillations ride on top of a field independent density of states, $\rho(B)$, for higher fields. This feature appears to be consistent with the recent specific heat measurements.

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