Abstract Submitted
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The Phase Diagram of Driven Density Waves[1] ROBERT THORNE, Cornell University — Despite nearly 30 years of study, the physics of the velocity-driving force relation of density wave (DW) conductors has remained controversial. Recent experiments indicate that at low temperatures collective DW motion begins at a threshold field E_T, but occurs via a new mechanism that we call coherent collective creep. A first-order transition from creep to high velocity sliding occurs when the DW reaches a critical velocity. As the temperature is increased, the transition vanishes at a critical point, and collective sliding begins immediately at E_T. This phase diagram is inconsistent with all existing models of driven elastic media in the presence of disorder, which assume a single length and energy scale associated with pinning. As emphasized by Larkin and Brazovskii, there are, in fact, two length and energy scales associated with local and collective pinning, respectively. This interpretation has broad consequences for our understanding of driven disordered systems.

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