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Non-linear quantum critical transport and the Schwinger Mechanism ANDREW G. GREEN, University of St Andrews, SHIVAJI SONDHI, Princeton University — Scaling arguments imply that quantum critical points exhibit universal non-linear responses to external probes. We investigate the origins of such non-linearities in transport, which is especially problematic since the system is necessarily driven far from equilibrium. We argue that for a wide class of systems the new ingredient that enters is the Schwinger mechanism—the production of carriers from the vacuum by the applied field— which is then balanced against a scattering rate which is itself set by the field. We show by explicit computation how this works for the case of the superfluid-Mott insulator transition of bosons at commensurate fillings.

Andrew Green
University of St Andrews

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