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Stripe melting and quantum criticality in correlated metals DAVID MROSS, SENTHIL TODADRI, Massachusetts Institute of Technology — In the last several years evidence for the occurrence of stripe and related orders has accumulated in many underdoped cuprates. With increasing doping the stripe ordering tendency disappears. This has given rise to the idea that a stripe melting quantum phase transition in the "underlying normal state" may play a role in some of the physics of the optimally doped strange metal. However there is currently no controlled understanding of a stripe-disordering phase transition in the presence of a Fermi-surface of electrons. We obtain a controlled critical theory of a continuous melting transition of charge stripes in a metal by proliferating pairs of dislocations in the stripe-order parameter, without proliferating single dislocations. At such a (deconfined) quantum critical point (QCP) the fluctuations of the stripe order parameter are strongly coupled, yet tractable. They also decouple dynamically from the Fermi-surface. We find that the full Fermi-surface and the associated Landau quasiparticles remain sharply defined at the QCP. On the stripe ordered side the reconstruction of the Fermi surface occurs at an energy scale that is parametrically different from that associated with the onset of stripe order.

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