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Heat bath approach to Landau damping and Pomeranchuk quantum critical points JOHAN NILSSON, ANTONIO CASTRO NETO, Boston University — We study the problem of the damping of collective modes close to a Pomeranchuk quantum critical point in a Fermi liquid. In analogy with problems in dissipative open quantum systems, we derive the Landau damping of a Fermi liquid by integrating out a macroscopic number of degrees of freedom from a generating functional. Being a reformulation of the linearized Boltzmann equation this approach reproduces well-known results from the theory of Fermi liquids. We also study the Bethe-Salpeter equations within the Landau theory and discuss the implications of these results on quantum phase transitions of the Pomeranchuk type and its dynamical exponent, z. We apply our results to the electronic nematic instability and find z=3 in the collisionless limit.

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