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Non Equilibrium Quantum Criticality: an intuitive approach EMANUELE DALLA TORRE, EUGENE DEMLER, Department of Physics, Harvard University, THIERRY GIAMARCHI, DPMC-MaNEP, University of Geneva, Switzerland, EHUD ALTMAN, Department of Condensed Matter Physics, Weizmann Institute of Science, Israel — Since their discovery in 1976, equilibrium quantum critical points have attracted continuous interest, due to their universality (i.e. the independence from the microscopic details of the systems). In two recent papers [1,2] we have extended these concepts to non-equilibrium systems, by studying the universal properties of quantum systems driven by time-dependent noise. We were able to demonstrated that [1] they can show a new class of non-equilibrium quantum criticality, and [2] small perturbations around the critical point lead to new physical phenomena, such as the spontaneous generation of an effective temperature and an effective dissipation. To this end, we developed a real-time renormalization group (RG) in the Keldysh path-integral formalism, which may however appear cryptic to the non-experts. In this talk, I will show how the main conclusions of the RG approach can be understood by simpler arguments based on circuit theory and fluctuation-dissipation relations.

- [1] E.G. Dalla Torre, et al. "Quantum critical states and phase transitions in the presence of non-equilibrium noise," Nature Physics 6, 806 (2010)
- [2] E.G. Dalla Torre, et al. "Dynamics and universality in noise driven dissipative systems," arXiv: 1110.3678 (2011)

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