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Dephasing by a Zero Temperature Detector and the Friedel Sum Rule BERND ROSENOW, University of Leipzig, YUVAL GEFEN, Weizmann Institute of Science — Detecting the passage of an interfering particle through one of the interferometer's arms, known as "which path" measurement, gives rise to interference visibility degradation (dephasing). Here we consider a detector at *equilibrium* [1]. At finite temperature dephasing is caused by thermal fluctuations of the detector. More interestingly, in the zero temperature limit, equilibrium quantum fluctuations of the detector give rise to dephasing of the out-of-equilibrium interferometer. This dephasing is a manifestation of an orthogonality catastrophe which differs qualitatively from Anderson's. Its magnitude is directly related to the Friedel sum rule.

[1] B. Rosenow and Y. Gefen, Phys. Rev. Lett. **108**, 256805 (2012).

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