Fermionic Mach-Zehnder interferometer subject to a Quantum Bath FLORIAN MARQUARDT, Departments of Physics and Applied Physics, Yale University, PO BOX 208284, New Haven, CT 06520, USA — The Mach-Zehnder interferometer represents the simplest possible two-way interference setup. In this talk I will present a theoretical analysis of decoherence in a fermionic Mach-Zehnder interferometer coupled to any quantum-mechanical environment, employing an equations-of-motion approach [cond-mat/0410333]. I will discuss the energy-resolved dephasing rate, the connection to the theory of dephasing in weak-localization, the importance of Pauli blocking, and the shot noise correction due to the environment. The results will be compared with simpler models of dephasing, including classical noise sources, and I will comment on their relevance for experiments [cf. Yi et al., Nature 422, 415 (2003)].

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