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Temporal fluctuations after a quantum quench: Many-particle dephasing FLORIAN MARQUARDT, University of Erlangen-Nuremberg, THOMAS KIENDL, Free University Berlin — After a quantum quench, the expectation values of observables continue to fluctuate in time. In the thermodynamic limit, one expects such fluctuations to decrease to zero, in order for standard statistical physics to hold. However, it is a challenge to determine analytically how the fluctuations decay as a function of system size. So far, there have been analytical predictions for integrable models (which are, naturally, somewhat special), analytical bounds for arbitrary systems, and numerical results for moderate-size systems. We have discovered a dynamical regime where the decrease of fluctuations is driven by many-particle dephasing, instead of a redistribution of occupation numbers. On the basis of this insight, we are able to provide exact analytical expressions for a model with weak integrability breaking (transverse Ising chain with additional terms). These predictions explicitly show how fluctuations are exponentially suppressed with system size.

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