Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Quantifying fermionic decoherence in many-particle systems ARNAB KAR, IGNACIO FRANCO, Univ of Rochester — Decoherence or the loss of quantum correlations in a system arises due to the interaction of the system with its environment. Our aim is to construct measures of decoherence that are applicable to multi-electron systems and, using them, understand the relationship between electronic correlations and decoherence. Usual measures of decoherence are of limited applicability in many body systems because they are based on the N particle density matrix which is generally not available. Here, we propose a hierarchy of measures of decoherence called distilled purities that are based on the hierarchy of r-particle reduced density matrices [1-2]. Given a single particle basis, these measures can be used to succinctly capture relevant coherences and interpret decoherence dynamics in driven and non-driven many body systems. The distilled purity measures will be exemplified using the dynamics of the Su-Schrieffer-Heeger Hamiltonian for trans-polyacetylene. The advantages and limitations of these distilled purity measures will also be discussed.

[1] I. Franco, H. Appel, J. Chem. Phys. 139, 094109 (2013)
[2] I. Franco and P. Brumer, J. Chem. Phys. 136, 144501 (2012)

Arnab Kar
Univ of Rochester

Date submitted: 14 Nov 2014 Electronic form version 1.4