

Abstract Submitted  
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**Measuring nonequilibrium spectral functions in a ion-trap-based quantum spin simulator**<sup>1</sup> BRYCE YOSHIMURA, JAMES FREERICKS, Georgetown Univ — Ref.<sup>2</sup> proposed to use a variant of Ramsey interferometry to measure the retarded spin-spin correlation function as functions of space and time. This protocol can be carried out in a linear Paul trap quantum spin simulator if single-site addressing of the spins is possible. A measure of the z-component of the spin translates into the two-time spin-spin correlation function of the transverse field Ising model. Since the system starts of in the ground state for large transverse field, and as the field is ramped down, it creates nonequilibrium diabatic excitations, the retarded Green's function that results is a nonequilibrium, state-selective Green's function. In this work, we present calculations of the behavior of these many-body correlation functions both as functions of time and of frequency.

<sup>1</sup>ARCS and NSF PHY-1314295

<sup>2</sup>M. Knap, A. Kantian, T. Giamarchi, I. Bloch, M. Lukin, and E. Demler, Phys. Rev. Lett. **111**, 147205 (2013)

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