

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**SU(3) classical representation of quantum dynamics of interacting spins** SHAINEN DAVIDSON, Boston University — The Wigner-Weyl representation of quantum mechanics allows quantum operators to be represented as functions over phase space variables. In this representation, the Wigner function plays the role of a phase space probability distribution, although it can be negative due to quantum mechanics. The Truncated Wigner Approximation (TWA) is a semi-classical approach, where the dynamics are approximated using the classical dynamics of phase space variables averaged over the Wigner function. We can use this formalism to study spin dynamics as well; however, if there are any terms not linear in spin operators, the dynamics are not exact. In the case of spin one systems, we can linearize a single spin Hamiltonian by recasting it in terms of  $SU(3)$  operators, where now we have eight operators instead of the usual three. Thus with TWA we can study the quantum dynamics of arbitrary spin one systems using eight “classical” spin variables per site, and the local TWA will be exact. I will discuss implications of this approach to interacting spin one systems and to the Bose-Hubbard model.

Shainen Davidson  
Boston University

Date submitted: 14 Nov 2013

Electronic form version 1.4