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**XUWEN CHEN\***, Department of Mathematics, University of Rochester, Rochester, NY 14627,  
and **Yan Guo**, Division of Applied Mathematics, Brown University, Providence, RI 02912. *On the  
Weak Coupling Limit of Quantum Many-body Dynamics and the Quantum Boltzmann Equation.*

The rigorous derivation of the Uehling-Uhlenbeck equation from more fundamental quantum many-particle systems is a challenging open problem in mathematics. In this paper, we exam the weak coupling limit of quantum N-particle dynamics. We assume the integral of the microscopic interaction is zero and we assume  $W^{4,1}$  per-particle regularity on the coressponding BBGKY sequence so that we can rigorously commute limits and integrals. We prove that, if the BBGKY sequence does converge in some weak sense, then this weak-coupling limit must satisfy the infinite quantum Maxwell-Boltzmann hierarchy instead of the expected infinite Uehling-Uhlenbeck hierarchy, regardless of the statistics the particles obey. Our result indicates that, in order to derive the Uehling-Uhlenbeck equation, one must work with per-particle regularity bound below  $W^{4,1}$ . (Received July 05, 2017)