Fundamentals of Relativistic Molecular Quantum Mechanics

Wenjian Liu

Institute of Theoretical and Computational Chemistry, College of Chemistry and Molecular Engineering, Peking University, Beijing 100871, P. R. China (liuwjbdf@gmail.com)

Relativistic Molecular Quantum Mechanics (RMQM) as the union of Relativistic Quantum Chemistry (RQC) and Quantum Electrodynamics (QED) consists of three components (i.e., Hamiltonian, wave function, and property), each of which is confronted with some fundamental issues, including, e.g., 'What is the appropriate relativistic many-electron Hamiltonian?'[1,2], 'How to make explicit and/or local representations of relativistic wave functions?'[1,3,4], 'How to formulate relativistic properties?'[5], 'How to interface RQC and QED?'[1], etc. In this lecture I shall try to address these fundamental issues from both conceptual and methodological standpoints, so as to establish the `big picture' of RMQM[6].

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