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Equivalence between floquet-magnus and Fer expansions to investigate the dynamics of a spin system in the three-level system

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In this poster, we present the orders to which the Floquet-Magnus expansion (FME) and Fer expansion (FE) are equivalent or different for the three-level system. The third-order calculation is performed of both approaches based on elegant integrations formalism. As the propagator from the FME takes the form of the evolution operator, which removes the constraint of a stroboscopic observation, we appreciated the effects of time-evolution under Hamiltonians with different orders separately. Our work unifies and generalizes existing results of Floquet-Magnus and Fer approaches and delivers illustrations of novel springs that boost previous applications that is based on the classical information. Due to the lack of an unequivocal relationship between the FME and FE, some disagreements between the results produced by these theories will be found, especially in NMR experiments. Our results can find applications in the optimization of NMR spectroscopy, quantum computation, quantum optical control, coherence in optics, and might bear new awareness in fundamental perusals of quantum spin dynamics.

Biography

Eugene Stephane Mananga is a Faculty Member in the Physics and Chemistry Doctorate Program at the Graduate Center of the City University of New York. He is an Assistant Professor of Physics and Nuclear Medicine at BCC of CUNY, and an Adjunct Professor of Applied Physics at New York University. Eugene completed his PhD in Physics from the Graduate Center of the University of New York, and holds 6 additional graduate degrees and training from various institutions including Harvard University, Massachusetts General Hospital (MGH), and City College of New York. Eugene did his postdoctoral studies in the National High Magnetic Field Laboratory of USA, Harvard Medical School, and Massachusetts General Hospital. Prior to joining Harvard - MGH, Eugene Mananga was an "Ingenieur de Recherche" in the French Atomic Energy Commission and Alternative Energies (CEA-SACLAY).

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