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NON-EXHAUSTIVE PLASMA SIMULATION

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First-principle simulation has been a consensus of plasma and beam physics community, however, how to do such a first-principle simulation still is not satisfactory. Current mainstream methods of the simulation are all in an exhaustive manner to calculate interacting charged particles. In these exhaustive methods, macroscopic information and microscopic information of plasmas are treated equally. The conflict between finite computer storage resource and nearly infinite microscopic information promotes inventions of various approximations for speeding-up simulation at the cost of scientific reliability of the simulation. A thorough solution to such a situation is a non-exhaustive method, which is based on a common basic mathematical property of Vlasov-Maxwell system and Newton-Maxwell system. The basic property determines the macroscopic information and microscopic one to be of unequal status. The macroscopic one is at the governing status and the microscopic one is the governed. The non-exhaustive method enables the first-principle simulation to be on a firm basis free from unnecessary approximations and fundamentally warrants its scientific reliability.

Biography

Hai lin began his career in physics through being a graduate in theoretical condensed matter physics in Nanjing University, China and received his Master of Science diploma here at 1997. After working many years in High-Field Laser Physics State Key Laboratory, Shanghai Institute of Optics and Fine Mechanics, Chinese Academy of Science, he received his doctor of philosophy diploma here at 2017. His research fields range from theoretical and computational plasma and beam physics and optics physics. Since 2000, he has been corresponding authors of more than 20 related mainstream journals, such as Physics and Plasmas, EuroPhysics Lett, Laser and Particles Beams, J of Optics Society of America B, Phy. Rev etc, and 2 chapters in 2 Intechopen books. His main area is focused on first-principle plasma simulation and its application to different topics.

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