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Lattice Boltzmann Simulations for Wave Propagation XIUBO SHI, YUEHONG QIAN, Institute of Applied Math and Mechanics, Shanghai University — In the past two decades, the lattice Boltzmann method(LBM) has attracted much attention as an alternative approach to the traditional methods in computational fluid dynamics. It possesses certain advantages in solving many problems over conventional methods. Here, we focus on the lattice Boltzmann model for wave equations. Firstly, in order to obtain wave equations with higher-order accuracy of truncation errors, we removed the second-order dissipation term and the third-order dispersion term by employing the moments up to fourth order in the lattice Boltzmann models with the classical Chapman-Enskog expansion. The time reversibility seems due to the accurate mimicking of the wave equations up to 4^{th} order, that is the absences of the second-order dissipation term and the third-order dispersion term. Secondly, the numerical verification for the model have been carried out, some classical examples are simulated, including wave interference, diffraction, and wave passing through a convex lens. The numerical results demonstrate that the model can be used efficiently to simulate wave propagations in various situations. Acknowledgement: This research is supported in part by Ministry of Education in China via project IRT0844 and NSFC project 10625210 and Shanghai Sci and Tech. Com. Project 08ZZ43

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