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Chaotic dynamics of a one-dimensional plasma PANKAJ KUMAR, BRUCE MILLER, Texas Christian University — The dynamics of a one-dimensional periodic plasma is investigated with N-body simulations using an event-driven algorithm. The algorithm is based on analytic expressions for the electric field and potential in the periodic plasma that makes it possible to follow the time evolution of the plasma exactly without resorting to numerical approximations. The temperature dependence of the largest Lyapunov exponent of the plasma is investigated by employing an efficient approach for defining the phase-space distance appropriate for systems with periodic boundary. The approach allows for the unambiguous test-orbit renormalization in phase space required to calculate the Lyapunov exponent. The results show evidence of a characteristic transition in the chaotic behavior of the plasma near a specific temperature in the thermodynamic limit.

Pankaj Kumar
Texas Christian University

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