Accelerated Macroscopic Monte Carlo method for gas-grain chemical simulations

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Abstract

Current macroscopic Monte Carlo (MC) method cannot be used to simulate a gas-grain reaction network that includes the accretion of gas phase molecular hydrogen onto grain surfaces.
Moreover, the computational cost for MC method to
simulate the chemical evolution of protoplanetary disks is also too high.
An efficient macroscopic MC method that can solve the problem is presented in this talk.
Our new method is based on quasi-steady-state assumption. Numerical comparisons
by the exact macroscopic MC method and our approximations will be discussed.
We expect our new method can be used to simulate disk chemistry.

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