Is PIC-MCC the right tool for the job?[1] ANDREW CHRISTLIEB,
Michigan State University — Recent work by M. Turner (Phys. of Plasmas Vol. 13,
2006) point out a potential problem when combining PIC with Monte Carlo Collision
(MCC) operators for modeling collisional plasmas. The outcome of Turner's work
is that reaction rates in plasma calculations may be three orders of magnitude too
fast. This means that most PIC-MCC codes may be providing a poor representation
of the true plasma chemistry. However, Turner's work was 1D-1V and it is not clear
how the additional degrees of freedom may play a role in the relaxation rates. There
are several possible hypotheses for the phenomenon observed by Turner. These
include; issues of an incomplete phase space, an interplay between local PIC errors
with the statistical noise of the MCC operator and a non-local interplay between
PIC and MCC errors. In this work we systematically explore these hypotheses using
1D-3V PIC and Boundary Integral Treecodes (BIT) and propose several solutions.

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