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The application of quasi-steady approximation in atomic kinetics in simulation of hohlraum radiation drive GUOLI REN, WENBING PEI, KE LAN, XIN LI, Institute of Applied Physics and Computational Mathematics, HOHLRAUM PHYSICS TEAM — In current routine 2D simulation of hohlraum physics, we adopt the principal-quantum- number(n-level) average atom model(AAM) in NLTE plasma description. The more sophisticated atomic kinetics description is better choice, but the in-line calculation consumes much more resource. By distinguishing the much more fast bound-bound atomic processes from the relative slow bound-free atomic processes, we found a method to built up a bound electron distribution(n-level or nl-level) using in-line n-level calculated plasma condition (such as temperature, density, average ionization degree). We name this method "quasi-steady approximation." Using this method and the plasma condition calculated under n-level, we re-build the nl-level bound electron distribution (Pnl), and acquire a new hohlraum radiative drive by post-processing. Comparison with the n-level post-processed hohlraum drive shows that we get an almost identical radiation flux but with more-detailed frequency-dependant structures. Also we use this method in the benchmark gold sphere experiment, the constructed nl-level radiation drive resembles the experimental results and DCA results, while the n-level raditation does not.

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