Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

Rescaling the chemical kinetics network through graph-theoretical analysis[1] TOMOYUKI MURAKAMI, Seikei Univ, OSAMU SAKAI, The University of Shiga Prefecture — We perform graph-theoretical analysis for extracting inherent information from complex reaction kinetics and devise a systematic way to rescale the network, where the scale-freeness and self-similarity in the network topology are maintained and the primary species are selected considering its topological centrality. Through a numerical simulation on atmospheric He+O2 plasma, it is demonstrated that the implementation of a simplified kinetic model allows the code to reproduce the plasma behavior obtained with an extensive model. The present chemical compression dramatically reduces the computational load. The proposed analytical approach enables us to exploit the full potential of expansive chemical reaction data and to achieve a more efficient and more robust kinetic system.

[1]This work was partially supported by JSPS KAKENHI Grant Numbers 18K18756 and 19K03813.

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Date submitted: 16 Jun 2020 Electronic form version 1.4