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Application of ILDM for Simplifying Complex Plasma Chemistry TAFIZUR REHMAN, KIM PEERENBOOM, Department of Applied Physics, Eindhoven university of Technology, Eindhoven, The Netherlands, EFE KEMANECI, Ruhr university Bochum, Theoretical Electrical Engineering, Bochum, Germany, WOUTER GRAEF, JAN VAN DIJK, Department of Applied Physics, Eindhoven university of Technology, Eindhoven, The Netherlands — Numerical simulation of plasma models involving large numbers of species and reactions is computationally very expensive. One of the solutions to overcome the problem due to complex chemistry is to employ Chemical Reduction Techniques(CRT) used in combustion research. The CRT we apply here is ILDM (Intrinsic Low Dimensional Manifold). ILDM simply uses the fact that, due to wildly varying time scales, the reaction system is not evenly sensitive to all the reactions but some reactions are very fast and attain steady state in a very short interval of time. Based on this information ILDM method finds the lower dimensional space (manifold) inside a complete statespace such that after a short interval of time the fast time scales of the system will quickly move onto this low dimensional manifold and the full system description can be given by this lower dimensional manifold. By constructing the low dimensional manifold the reaction space is described in terms of only a few parameters and it becomes possible to tabulate the results in terms of those few parameters. By generating the look-up table, for given values of controlling parameters the remaining parameters are found explicitly. In this work we apply the ILDM method for the reduced simulation of an argon plasma.

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