

Abstract Submitted
for the GEC08 Meeting of
The American Physical Society

ZDPlasKin: a new tool for plasmachemical simulations SERGEY PANCHESHNYI, BENJAMIN EISMANN, GERJAN HAGELAAR, LEANNE PITCHFORD, LAPLACE, University of Toulouse, CNRS — We present ZDPlasKin (Zero-Dimensional Plasma Kinetics) freeware utility which was developed for a wide range of complex plasmachemical simulations in various gas mixtures. Our approach is based on a local approximation of the evolution of species densities obtained by solving the conservation equations. In a first step a pre-processor is used to translate a list of species, reactions and corresponding rate constants in a simple user-friendly text format into a FORTRAN 90 module. This automatically generated module contains the definition of the problem, an interface to the DVODE_F90 ODE solver and a set of supplementary routines. It includes as well an automated link to BOLSIG+, a Boltzmann equation solver based on the two-term approximation, which provides the electron transport rates and the rates of electron-neutral collisions. In a second step, execution of the code yields the time evolution of the species densities and the reaction rates. A simple acquisition algorithm allows tracing of time-averaged species densities and corresponding source terms and reaction rates for sensitivity analyses. Examples will be presented to demonstrate the simple interface and efficiency of the utility. The utility will be soon available for downloading from the LAPLACE web site <http://www.laplace.univ-tlse.fr>.

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Date submitted: 02 May 2008

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