

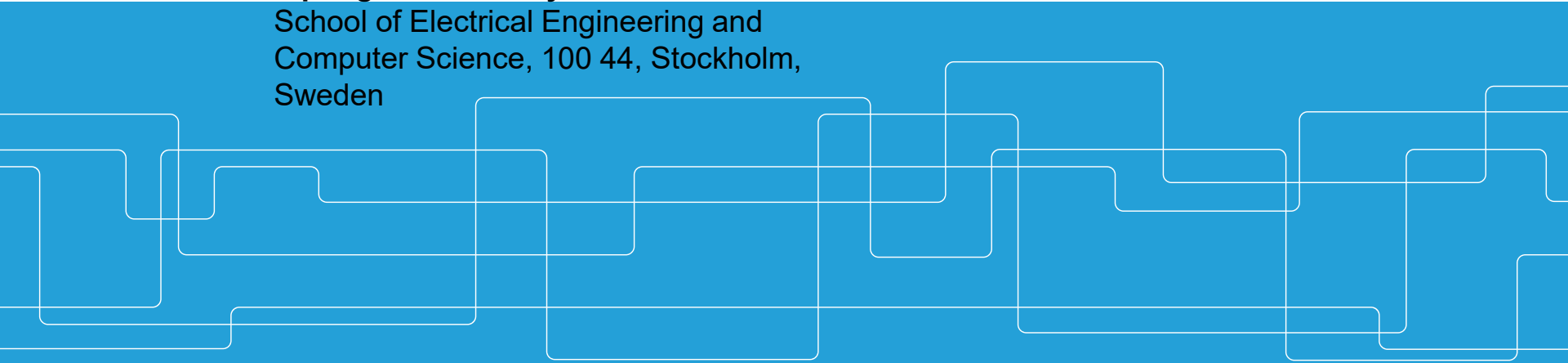


S2L: App for Simulation of Streamer-to-Leader Transition With 1D Thermo-Hydrodynamic Model

Application Help

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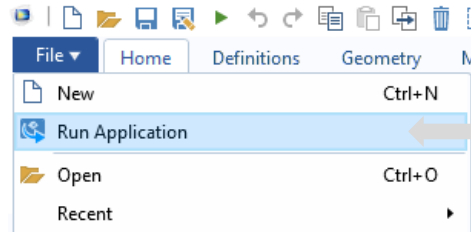
About S2L

- S2L is a COMSOL application that contains a model to perform simulation of the streamer-to-leader transition with a 1D thermo-hydrodynamic model. The detailed information about the model is described in detail in Liu, L and Becerra, M. "Gas heating dynamics during leader inception in long air gaps at atmospheric pressure." *Journal of Physics D: Applied Physics* 50.34 (2017): 345202. Any derivate work from S2L should cite this reference as source.
- S2L is created in COMSOL Multiphysics and can be run in versions 5.4 or superior.
- S2L allows you to setup, run and visualize the detailed thermo-hydrodynamic properties of a streamer stem during its transition to a leader channel in dry air under a constant injected (low) current.

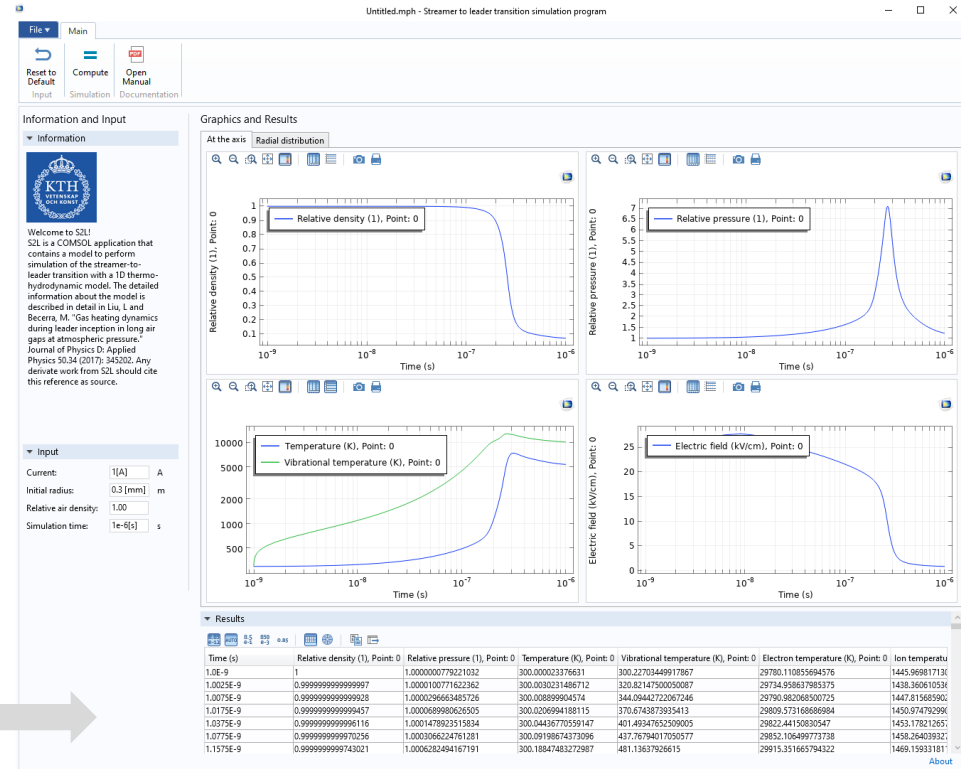


Running S2L

- Open your COMSOL Desktop environment (version 5.4 and superior) and select the Run Application to open the application



After clicking, the main window of S2L_1D is launched

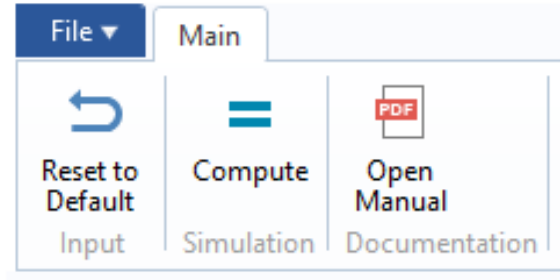




S2L Main Window

Toolbar

The S2L toolbar in the App allows the user to reset to default, to solve model and to consult this App manual.



To run a simulation, run the icons in the toolbar from left to right. The help about how to operate the app is in the App Manual icon.



S2L Main Window

User Inputs

The S2L user can set the current flowing through the streamer stem, the initial radius of the stem, the relative air density of the environment. You can also set the simulation time. Note that the simulation will stop at the simulation time or when the temperature at the axis reaches 9000 K.

▼ Input


Current:	<input type="text" value="1[A]"/>	A
Initial radius:	<input type="text" value="0.3 [mm]"/>	m
Relative air density:	<input type="text" value="1.00"/>	
Simulation time:	<input type="text" value="1e-6[s]"/>	s



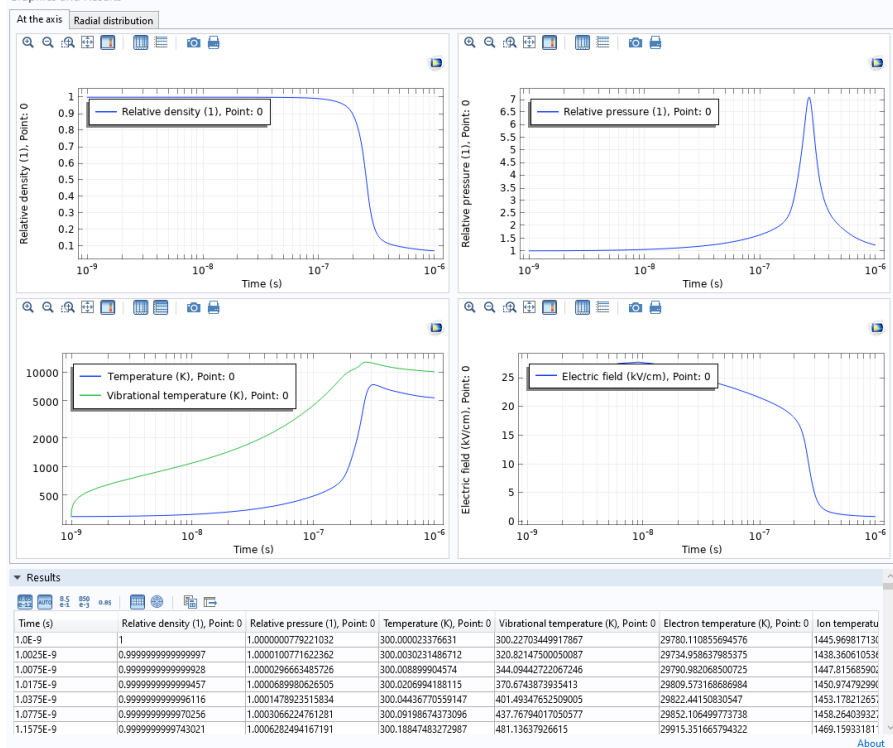
S2L Main Window

Results

The Graphics section shows the dynamics of some important parameters at the axis as a function of time and the distribution along the radial direction.

The Results section gives a detailed table of the all important parameters in the model which has been explained in the paper (Liu, L and Becerra, M. "Gas heating dynamics during leader inception in long air gaps at atmospheric pressure." Journal of Physics D: Applied Physics 50.34 (2017): 345202) in details. The uses can export the data by click the export button 

Graphics and Results





S2L Maintenance

This is the beta version of S2L. It will be maintained by M. Becerra at KTH Royal Institute of Technology. For feedback and future cooperation in research please contact

marley@kth.se