How to run a small example with STRUPHY_April2020.py – a very short overview

1. It is recommended to use Pyccel https://github.com/pyccel/pyccel for code acceleration. After cloning the repository and making sure that all dependencies are there, one can install pyccel with "*python3 -m pip install --user -e .*". If one wants to work with pure Python, this step can be skipped.

2. All inputs for a simulation are e.g. in "*simulation_05042020_1*": *initial_conditions_MHD.py, initial_conditions_PIC.py, equilibrium_MHD.py, equilibrium_PIC.py* and *parameters.py*.

3. The file *interface.py* in hylife/ collects all input files and distributes them to all subroutines. This means that you have to make sure that the link to the input files is correct. E.g.

   import simulation_05042020_1.equilibrium_MHD as eq_mhd
   import simulation_05042020_1.equilibrium_PIC as eq_pic
   import simulation_05042020_1.initial_conditions_MHD as ini_mhd
   import simulation_05042020_1.initial_conditions_PIC as ini_pic

   in lines 6-9.

4. If you use Pyccel, now is the time to apply it! For this you have to make sure that in the makefile the link to the input files is correct. E.g.

   EQM := simulation_05042020_1/equilibrium_MHD
   EQP := simulation_05042020_1/equilibrium_PIC
   ICM := simulation_05042020_1/initial_conditions_MHD
   ICP := simulation_05042020_1/initial_conditions_PIC

   in lines 14-17. You can then generate the Fortran and .so files just by typing "*make*". This may take a couple of minutes (10-15 minutes for the first time).

5. Now everything is there to run the main code "STRUPHY.py". Again you have to make sure that the link to the input files is correct, i.e.

   import simulation_05042020_1.parameters as pa # name input folder here!
   identifier = 'simulation_05042020_1' # name input folder here!

   in lines 29 and 30. You can then run the code with "*python3 STRUPHY.py*". This will create the file "results_simulation_18052020_1.hdf5" with some output data into the folder "*simulation_05042020_1*".