Here's the code for the time-dependent simulations and Paris-Durham:

For Paris-Durham, you import PDinputwriter.py, then run writeinputs(run\_name, params) to change parameters and set up the folder for that run, then run either runPD(run\_name) or runPD\_timed(run\_name) to perform the actual run (documentation for how to use each of these is in PDinputwriter.py). The params variable in writeinputs is a dictionary of parameters to be changed in Shock\_1.1/input/[input\_mhd.in](https://urldefense.com/v3/__http:/input_mhd.in__;!!CGUSO5OYRnA7CQ!YXgWKAHuCSq-BQkJOH_wjA6nU028qWJrqKzq5Ku37YHCZzKaP-jOq_IkZV65F5BMCRg_YpTu3_1E8hzdN08B4TK-O1FuRQ$) and the values you want them changed to (so an appropriate input would be writeinputs("testrun",{"Bbeta":0.1}) followed by runPD("testrun"), this will conduct a run named "testrun" that will appear in Shock\_1.1/output). As a warning, writeinputs changes the parameters from the last run in [input\_mhd.in](https://urldefense.com/v3/__http:/input_mhd.in__;!!CGUSO5OYRnA7CQ!YXgWKAHuCSq-BQkJOH_wjA6nU028qWJrqKzq5Ku37YHCZzKaP-jOq_IkZV65F5BMCRg_YpTu3_1E8hzdN08B4TK-O1FuRQ$), so make sure you keep a default copy of [input\_mhd.in](https://urldefense.com/v3/__http:/input_mhd.in__;!!CGUSO5OYRnA7CQ!YXgWKAHuCSq-BQkJOH_wjA6nU028qWJrqKzq5Ku37YHCZzKaP-jOq_IkZV65F5BMCRg_YpTu3_1E8hzdN08B4TK-O1FuRQ$) around to reset the inputs after you're done.

The methods in PDinputwriter need to be run in the Shock\_1.1 folder or given a path to the Shock\_1.1 folder. Also, to the best of my knowledge, Paris-Durham cannot be run in parallel.

For the jupyter notebooks, they each contain most of the same code, but the Time Dependent one has my attempts to numerically solve the equations given in the Li et al paper added at the end, while the Linear Growth Envelope one has the linear growth regime densities plotted over the cavity shape. You may need to comment out some FiPy imports at the start. Also, they may not be the best documented, so if you have any questions or would like more documentation added for something, please ask.