

Running TDE in GR with PHANTOM

IF YOU COULD, DO IT ON OzSTAR

<https://phantomsph.readthedocs.io/en/latest/getting-started/ozstar.html>

GET THE CODE

Github <https://github.com/danieljprice/phantom.git>

Documentation <https://phantomsph.readthedocs.io/en/latest/getting-started/gitinfo.html>

SETUP AND TEST RUN

<https://phantomsph.readthedocs.io/en/latest/getting-started/running-first-calculation.html>

SETUP STAR AND PUT INTO TDE ORBIT

<https://phantomsph.readthedocs.io/en/latest/examples/star.html>

DIFFERENT FROM THE DOCUMENTATION

To run a GR TDE, the star needs to be setup in relativistic way

```
make setup GR=yes METRIC=minkowski
```

The star parameters can be changed in `star.setup`. For test run, low number of particles is preferable. A 1Msun 1Rsun polytrope with 5000 SPH should be able to finish within 30 minutes.

To relax star, **uncomment** line 116 in **src/main/deriv.F90** otherwise error would occur

```
call prim2consall(npart,xyzh,metrics,vxyzu,dens,pxyzu,use_dens=.false.)
```

To run the TDE in GR

```
make moddump GR=yes METRIC=kerr MODFILE=moddump_tidal.f90
```

```
make GR=yes METRIC=kerr or make GR=yes METRIC=schwarzschild
```

If using parabolic orbits, i.e. `ecc = 1`, set the starting distance `r0` to be large, e.g 100 tidal radius

There are no magnetic fields in GR code. We haven't got GRSPMHD yet (cry)

VIEW YOUR SIMULATIONS

We use `splash` to view the simulation dumps

<https://splash-viz.readthedocs.io/en/latest/>

If you are on OzSTAR, you can load splash with `module load splash`

Otherwise, on Windows Linux subsystem or Linux `sudo apt-get install splash`

On Mac `brew install splash`

Basic use of splash `splash your_dump_name`