Cooling halo and fragmenting disk

My first steps with Ramses: Cooling Halo and fragmenting disc

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Hipacc Summer School- UCSC - 08/13/2010

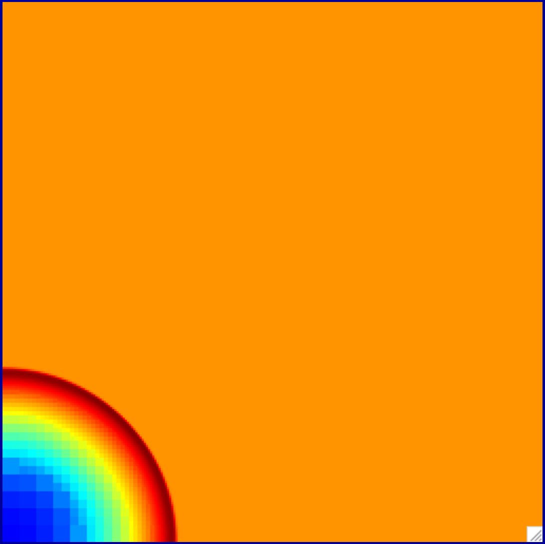
[1] I'm french (BZH), french mother but english father

First impression

- Easy to compile, just read the Makefile
- Code: Well written and organised in directories.
- Quite strait forward to travel within the code. (usually by grepping in */*.f90)
- Patching is strait forward and easy... (could patch a bug by myself)
- ...if you 're sure to copy the right file into your patch directory [2]

[2] directories mhd/ and hydro/ containing files in with are quite but not totality unlike each other

Test: Sedov 2d case



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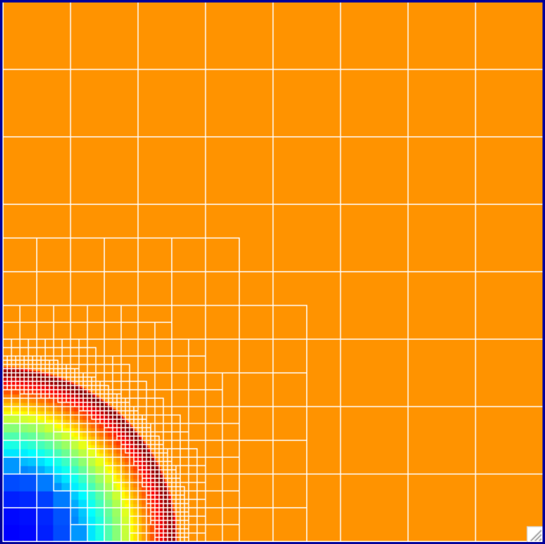
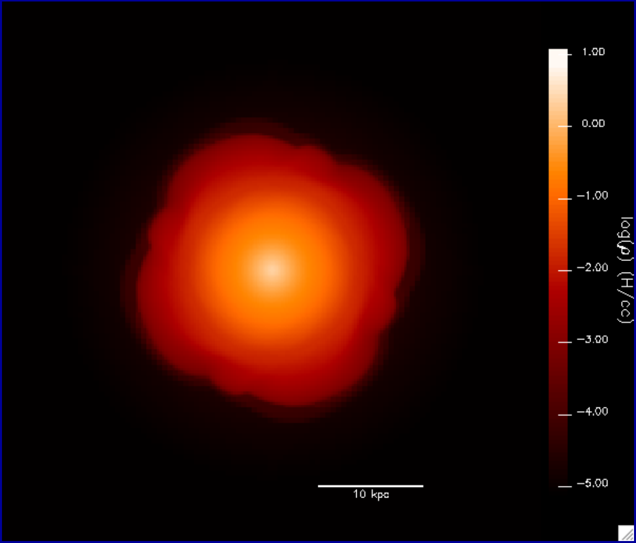


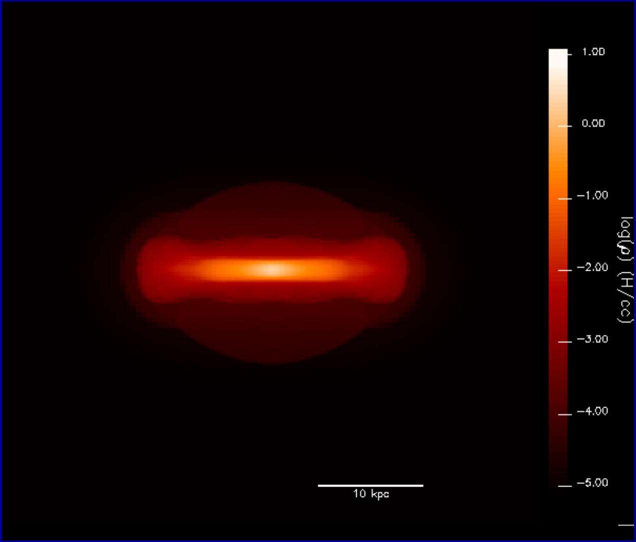
Cooling halo and fragmenting disc

- isolated halo ($v_{200} = 35 km/s$; $c = 10.$;spin $= 0.1$; $f_{\rm gas} = 0.15$;$B = 10^{-5}$)
- cooling parameters $[T2_{\rm star}; n_{\rm star}] = [10^4, 0, 1]$ and default $[z_{ave}, g_{\rm star}] = [0., 1.6]$
- coarse grid level 7, max refinement 11
- Box size ~ 300 kpc, resolution ~ 0.15 kpc.
- output at ~ 5.74 Gyr

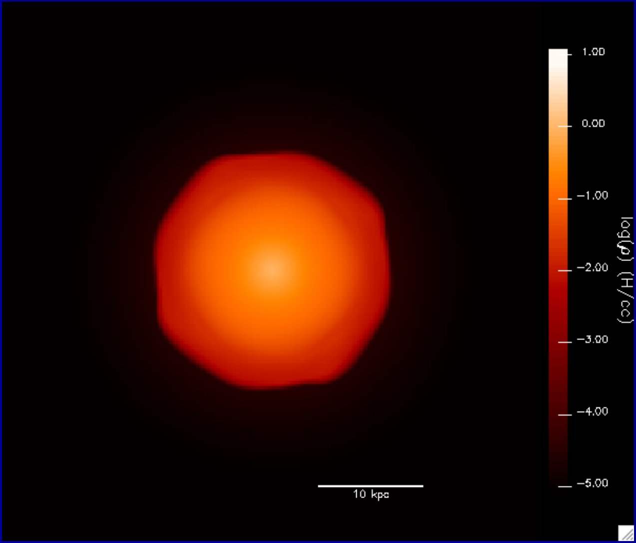
First result



First result



Adding solar metallicity $z_{\text{ave}} = 1$ and setting $g_{\text{star}} = 2$



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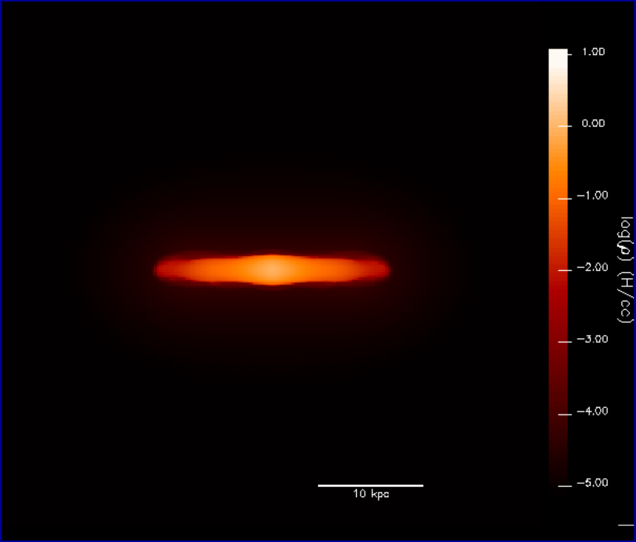
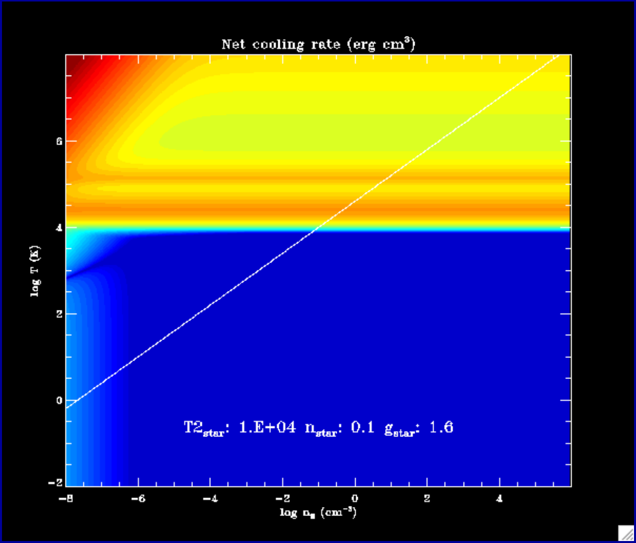


Net cooling rate for those runs



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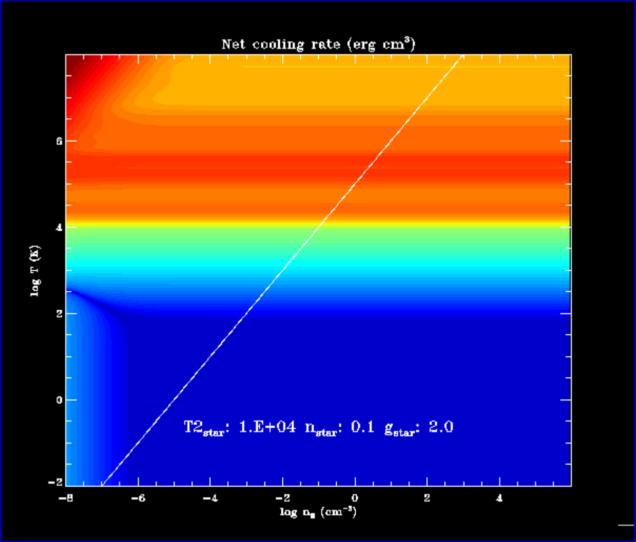

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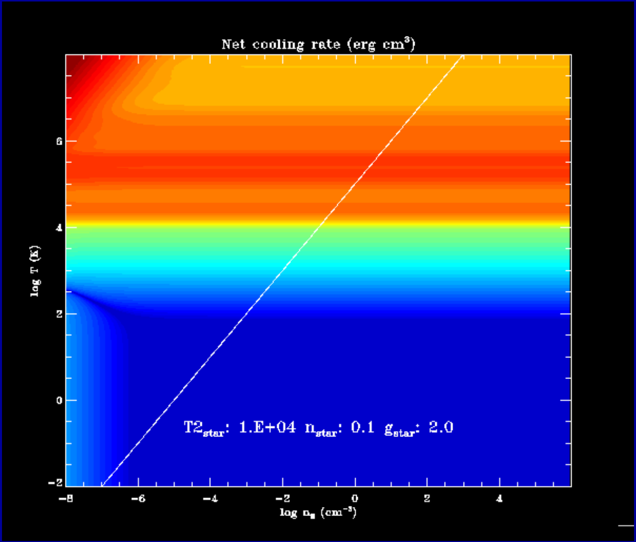
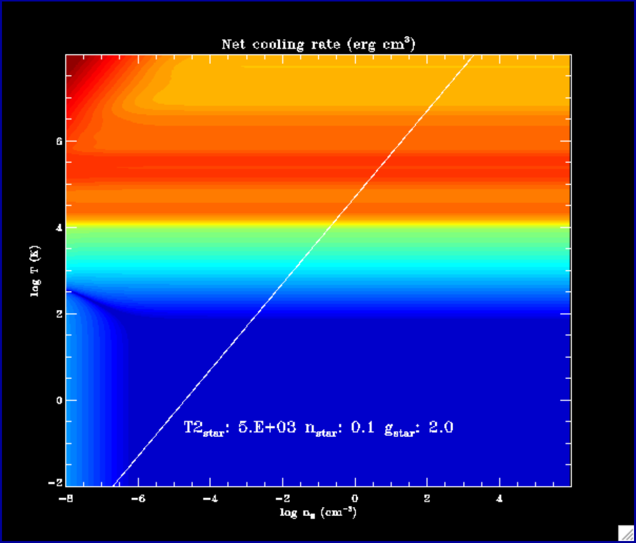
- To prevent artificial fragmentation : $\Lambda_J > 4\Delta x$

Decreasing the Pressure floor



Decreasing the Pressure floor



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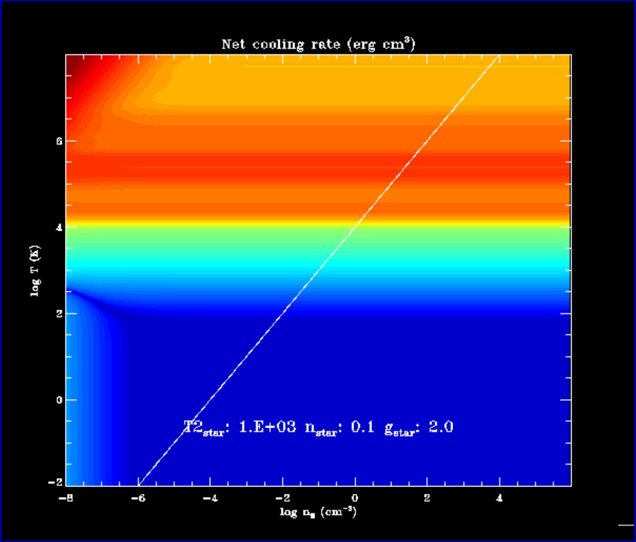


Decreasing the Pressure floor

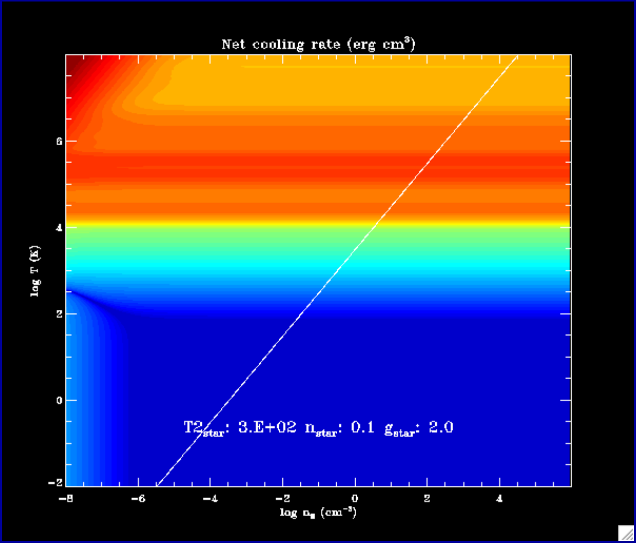
Cooling halo and fragmenting disk

Running Ramses

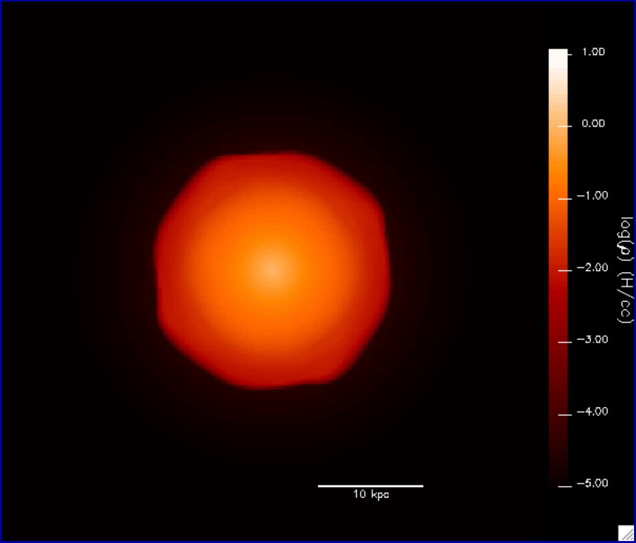
3D case: Cooling halo and fragmenting disc

Toying with the polytropic pressure floor

Conclusion



$T2_{star} = 10000, n_{star} = 0.1, \Lambda_J = 33.98\Delta x$



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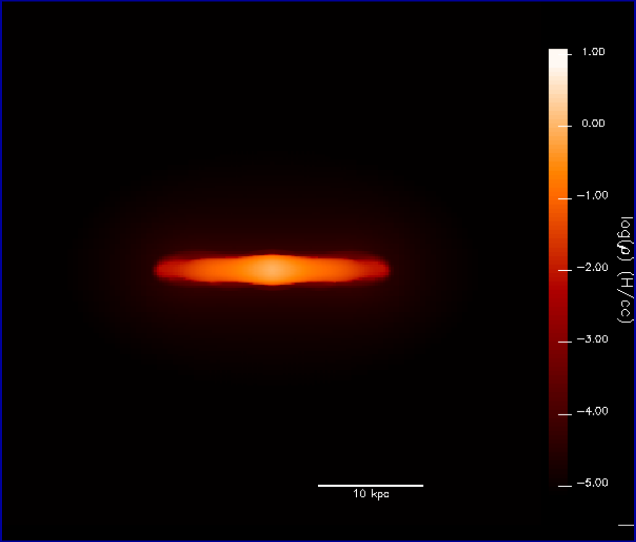
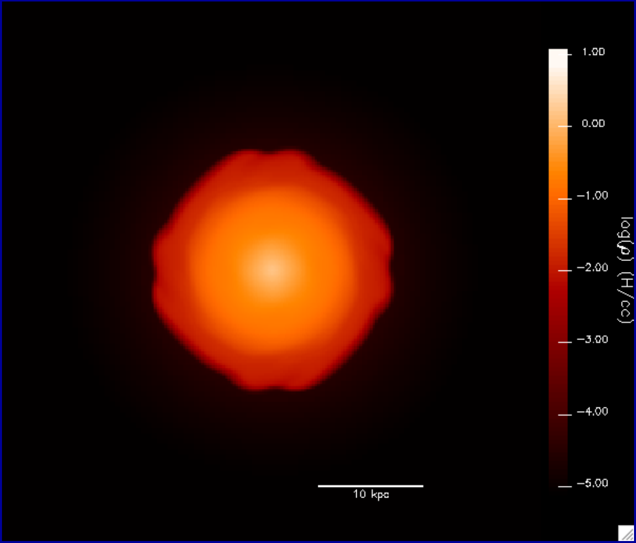


$T2_{\rm star} = 5000, n_{\rm star} = 0.1, \Lambda_J = 24.03\Delta x$



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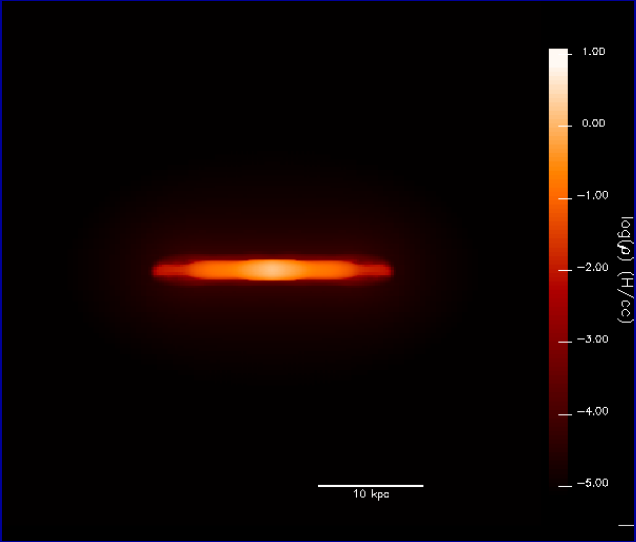
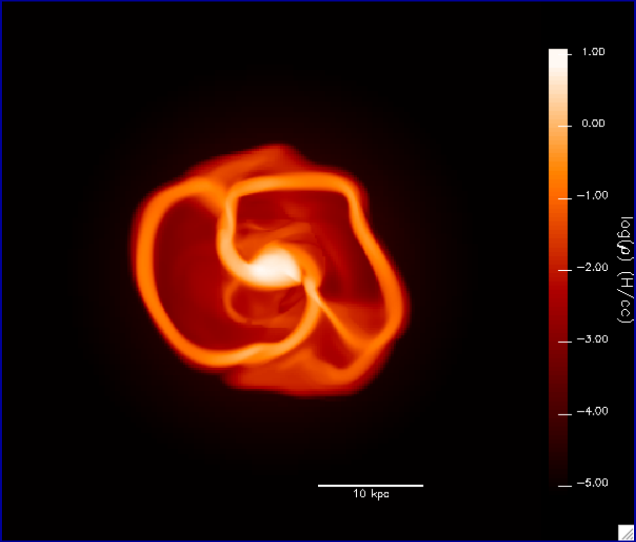


$T2_{\rm star} = 1000, n_{\rm star} = 0.1, \Lambda_J = 10.75\Delta x$



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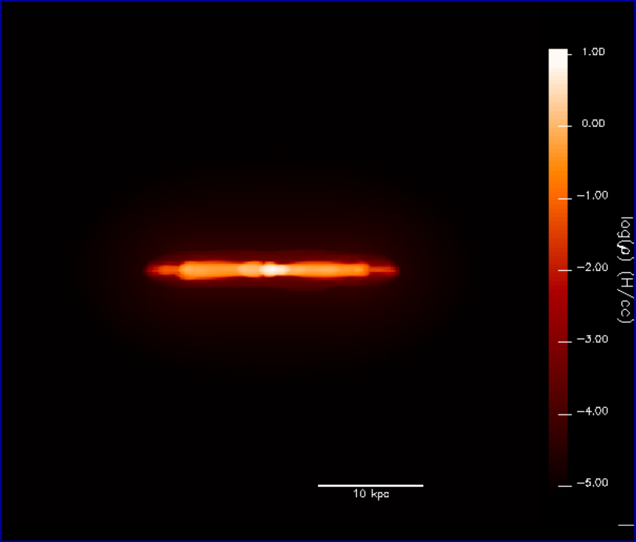

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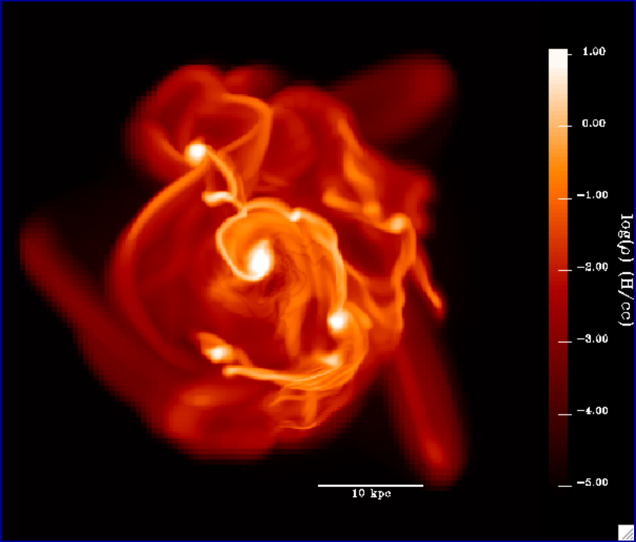

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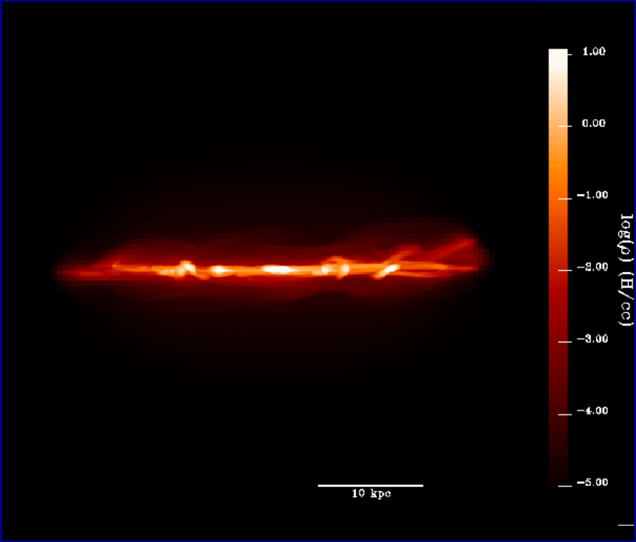

Conclusion

- Learned how to send a job using PBS script.
- got much much familiar with Ramses
- got an idea, of the work involved in getting accurate physics from a simulation
- created my own visualisation routines from the one provided. (learned new good tricks with idl)
- was happy to share the little experience I had with others running the same project.