Github repo url: <https://github.com/ThaiChant/IoA_snoopy>

Main code is located in “RATIR\_CSP\_analysis.ipynb” on github.

Areas that need to be worked on for final paper data:

* Add cut that removes low observations.
* This can either be automated by passing each SN through a function that takes the number of J-band observations and removes all SN with lower than the cut-off observations. Or make a list of the SN and use the splitter function.
* The cut-off we decided on was removing all SN with 2 or less observations across all J-band filters. The file on github “table\_SN\_J\_band\_obs.obs” contains a breakdown of how the cut-off number affects the sample size, as well as the individual SN that have low observation numbers.
* Find a way to remove the so called “questionable” fits. We have tried to use a reduced chi-squared and then remove SN with with n depending on the remaining sample size. Could make own chi-squared function using “evaluate” to do this or use another statistical parameter.
* Questionable fits are included on github in the “peculiar\_lc\_fits” directory.
* Add a phase cut which removes all SN with a phase greater than 10 days. An example of how to calculate phase of an SN is included in “phase\_Tmax.ipynb” on github.
* Possibly simplify things by making one .dat file which includes all data on each supernova. E.g. mass, phase, no obs, z, J-max etc. This will make the code simpler, particularly for the cuts.
* Configure further cuts such as EBV and sBV either from reliable reference values or from the fittings (or doing colour\_model fittings for EBV on the EBV\_model fits). Currently CSP uses Burns et al 2018 values whereas RATIR uses values calculated from the fits. There needs to be consistency between the two data sets.
* Cut the remaining sample according to redshift (we were primarily cutting z<0.01) and mass for whatever the final plots are to use.
* Unblind H0 when completely finished.

Likely causes of bugs:

* The different name systems for the SN. E.g. SN2009A or SN2007ax causing SN to not be recognised in the cuts as well as importing the mass values.
* Using the splitter function correctly.

Plots that I think could look good:

* Hubble plot that uses finished aj for the line of best fit and labels the data according to one or more of: mass, Sample, cut/not cut (with labels for reason why e.g. SN with phase > 10), etc.
* Corner plot from final emcee analysis that includes H0.
* Comparison plot between the two models for final parameter values with errors (including H0).
* See “complete\_record\_TC\_1.pdf” on github for examples of these and other plots.