Y4 Project meeting 2 record

Date and time: 08/10/19, 14:00-15:40

Attended by: Guy, Harry and Hin

Discussed:

1. What open clusters are and how they evolve.
2. Hierarchical modelling crash course: methods for estimating ages of stars in open clusters
   a. MCMCs
   b. Hamiltonian Monte Carlos
   c. How these two are combined into HMCs (Hamiltonian Markov Chains)
   d. Build a model and then explore it using a HMC specifically the No U-turn Sampler (NUTS)
3. Enrichment of open clusters by Type 2 and Type 1a supernovae
4. Suggested methods to get posterior age estimates for stars in an open cluster:
   a. Build in the concept that the age of the star in an open cluster is from a 2d distribution.
   b. We could go further such that they are formed from 2, 2d distributions.
   c. We could simulate the 2, 2d planes.

Key Takeaways: Use AIMS (Asteroseismic inference on a massive scale) to get individual ages and build a model which be explored using a No U-turn Sampler.

To do:

Students:

1. Do a literature search: what is there on asteroseismic open clusters, with published age estimates
See: M67, NG6819, NG6791, rupprecht 47/147?

Reviews on open clusters: best ones summarise the whole field i.e. here is the current status of research on open clusters, we know what open clusters are because this person did this that and the other.
See: Ted Von Hippel (review from 2005)

2. Bring laptops to next meeting
3. Install Pymc3

Tutor: reminders

1. Add Harry and Hin to the Hierarchical Bayesian modelling GitHub repo (so we can see how it was made)
2. List of open clusters worth checking
3. Next week, walk through hierarchical modelling (make some data, do some analysis)

Next meeting: 14/10/19 (Mon) 14:00 in Guy's office

Recorded by: Harry