WG stars and stellar evolution summary

WG members by research area:

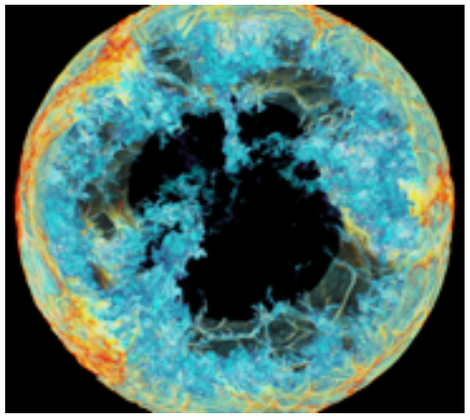
- stellar evolution
- stellar hydrodynamics
- nuclear physics

Major challenges in stellar evolution:

- convection (discussion: dominant contribution to uncertainty and solvable)
- mass loss (hydro simulations are getting better, many new observations, need to be incorporated into next-gen models)
- mixing uncertainties more strongly affect ultra-low and zero Z predictions
- other mixing processes: rotation and magnetic fields, "extra-mixing"
- effects of progenitor evolution on SN explosions
- lowest-mass SN progenitors, super-AGB

Most stars are binaries!!!

3D stellar hydro



H-ingestion Sakurai's object
(Woodward, Herwig + 2012, in prep)

- address open questions in stellar convection
- moving into the mainstream
- "if we would spend today as much computational effort on stellar evolution as people did in the 70' we could take 3D effects of convection into account ... in some way"
- discussion on how to interweave 1D and 3D, different approaches thinkable, to be explored

Validation

- opportunities in pre-solar grains
- ...

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Nuclear physics perspective

- Validation of models through systematic observations
- Nuclear physics uncertainties affect our understanding of stellar structure and evolution
- Nuclear database needs significant improvement - especially at low temperatures (extrapolations can still be perilous)
- Nuclear physics must be directly linked to observables
- Interface of astrophysics, astronomy and nuclear-physics experiment needs to be strengthened