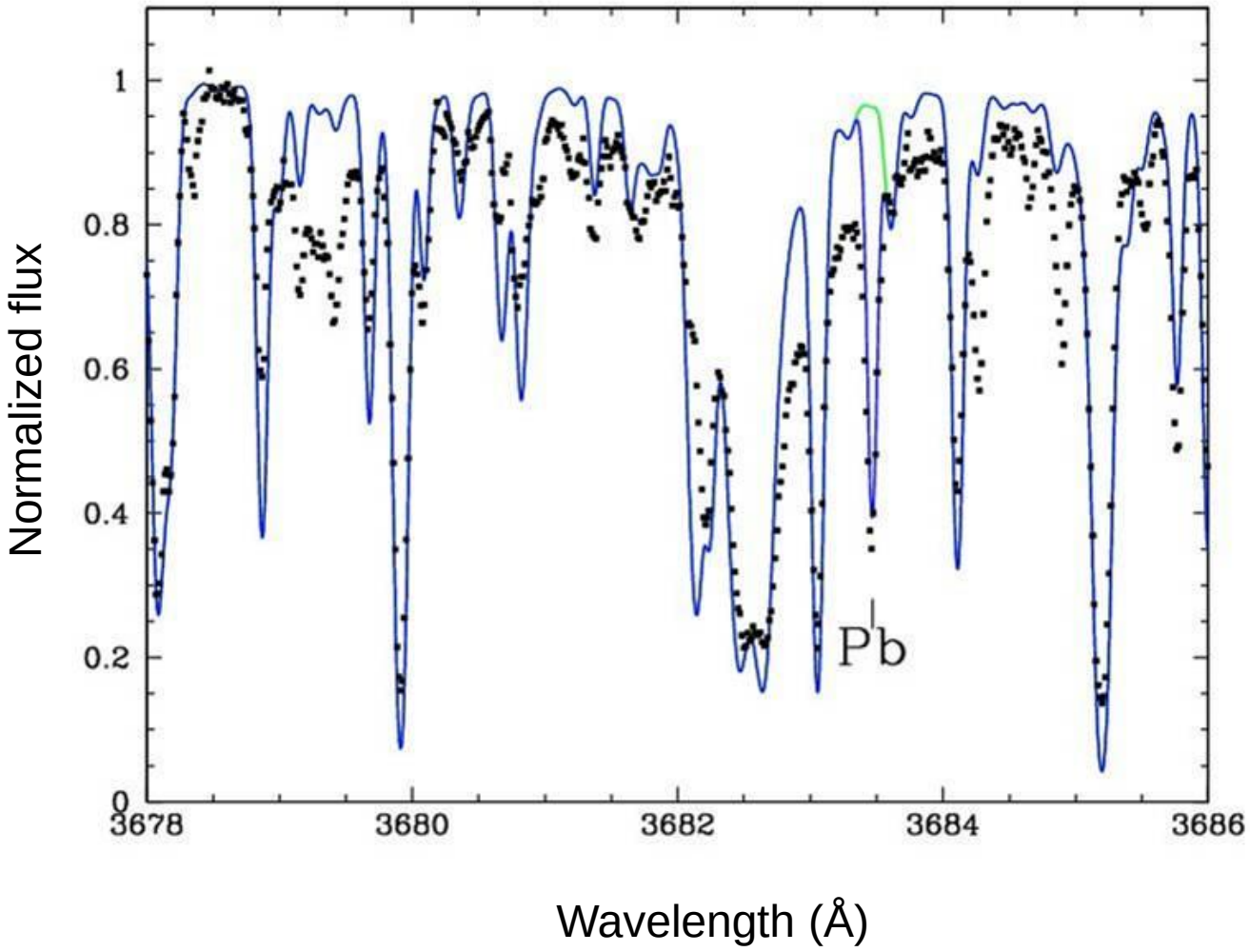
Etoiles carbonées et pauvres en métaux: témoins des premières générations d'étoiles

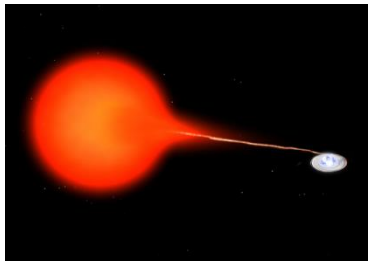
Thomas Masseron, IoA, Cambridge

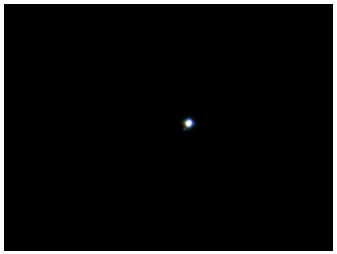
Technique: spectroscopie haute résolution

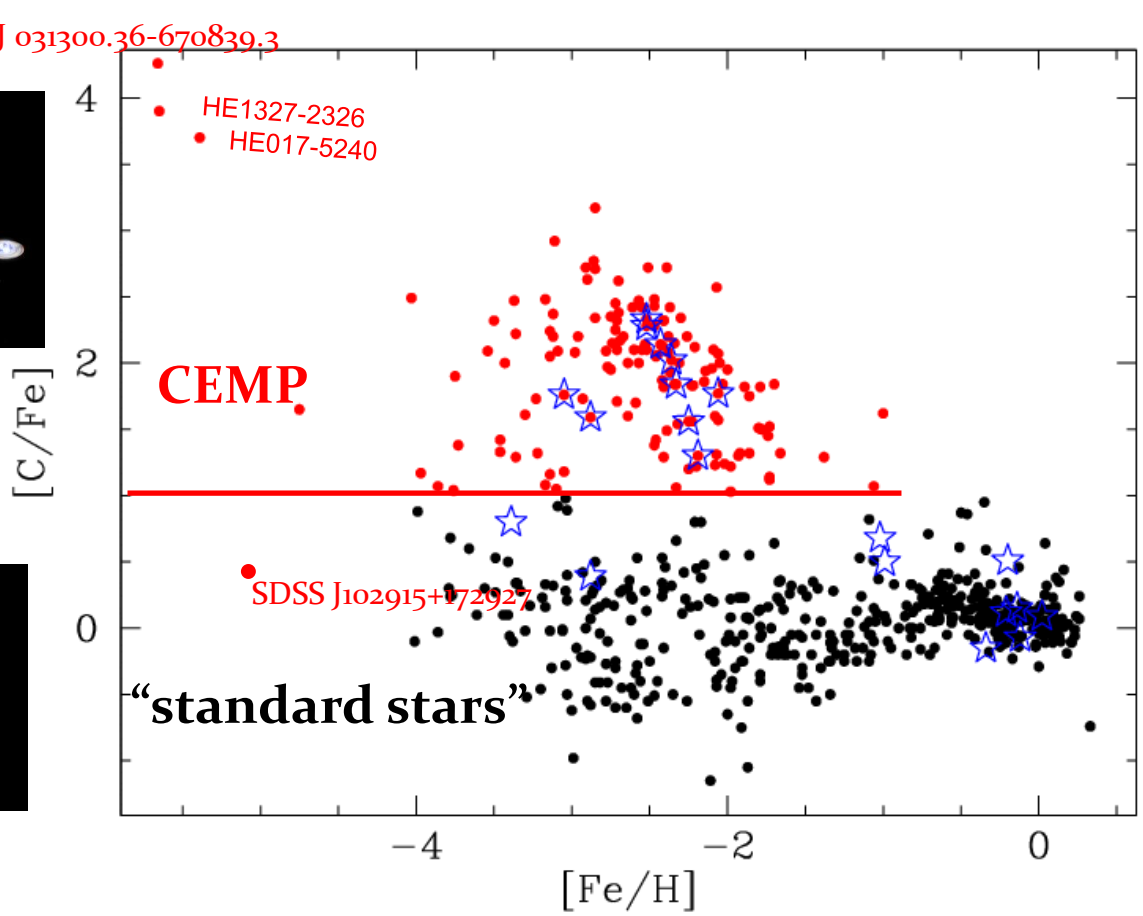


Déterminer paramètres stellaires (Teff, logg) et abondances individuelles

The Carbon Enhanced Metal-Poor (CEMP) stars phenomenon



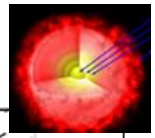




(Masseron 2006)

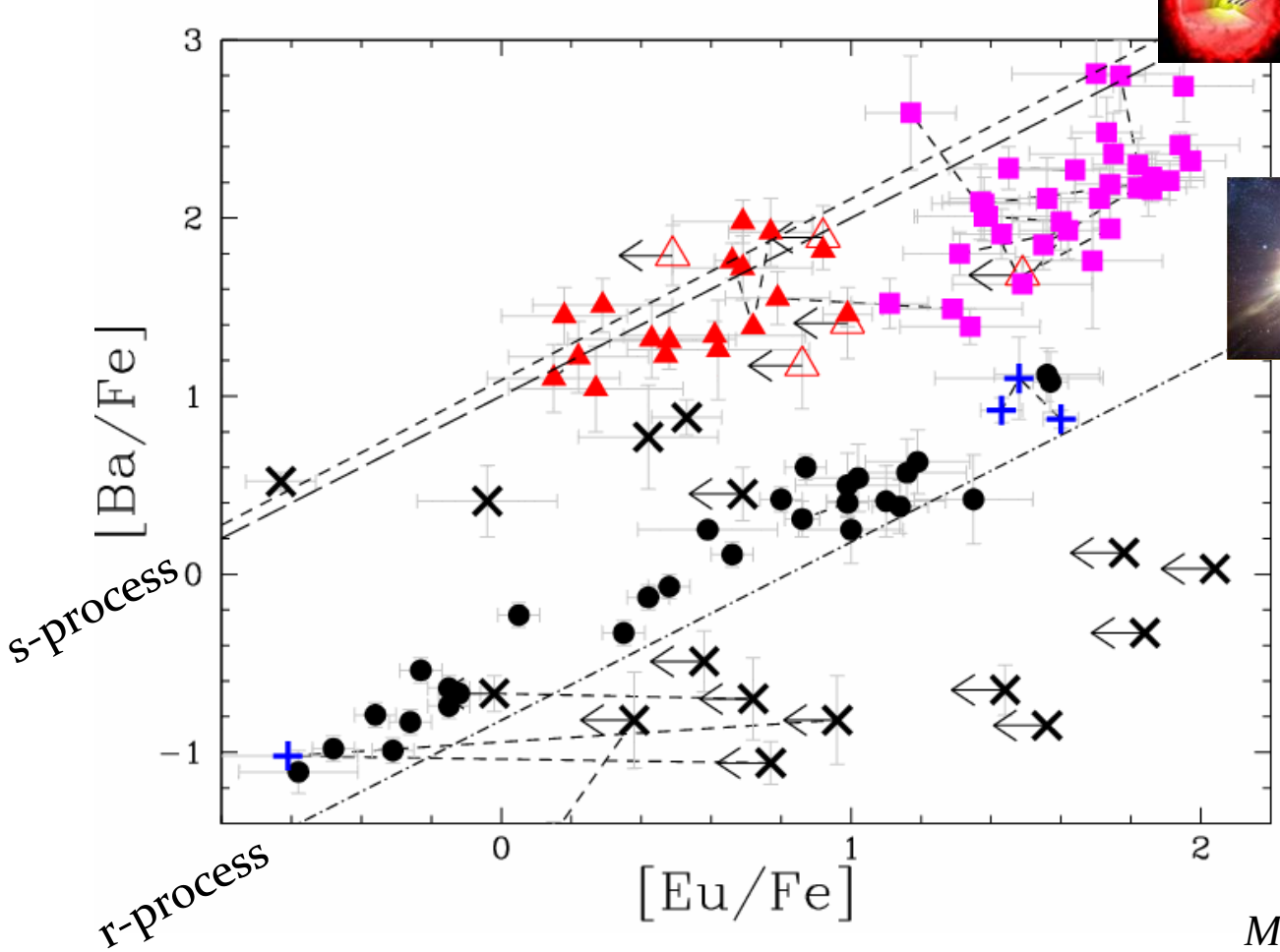
Ces étoiles représentent une opportunité unique d'étudier la première génération d'étoiles !

AGB vs SN



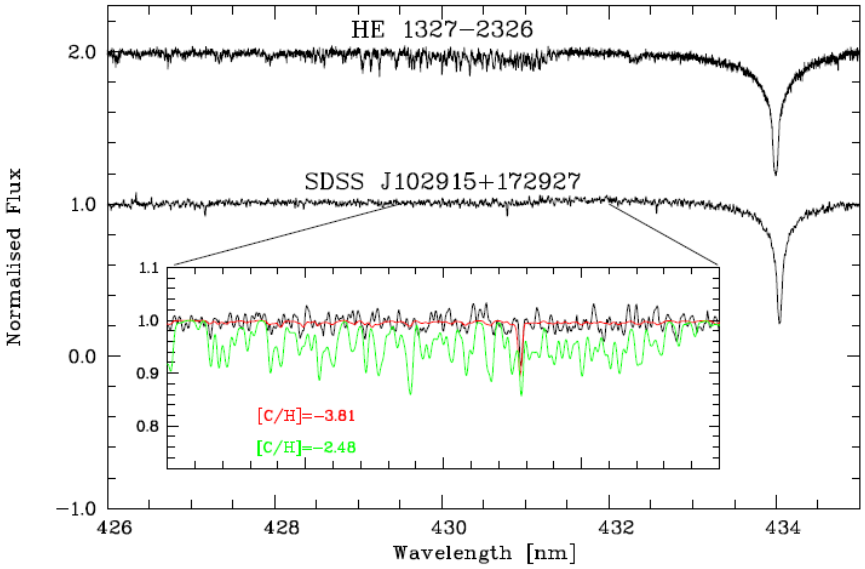
1-10$M_\odot$

>10 $M_\odot$

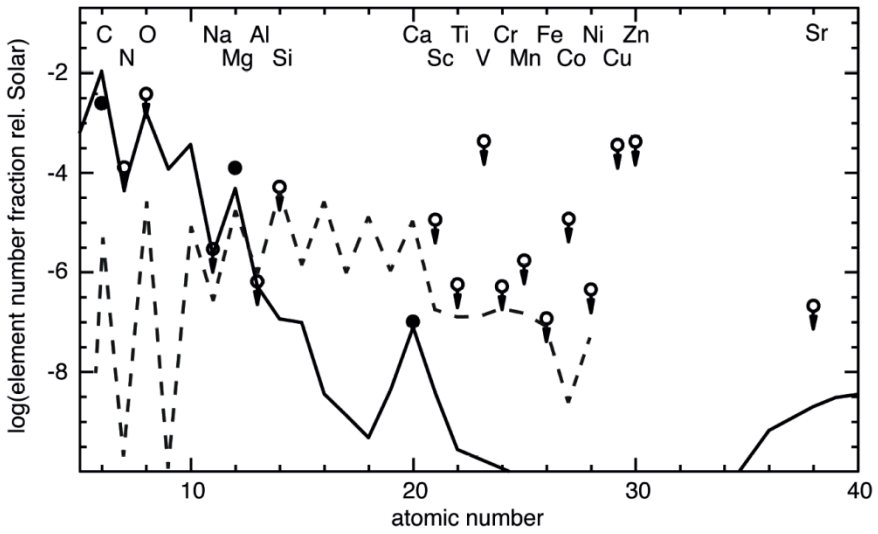


Masseron et al. (2010)

Contraintes sur la modélisation des SNII



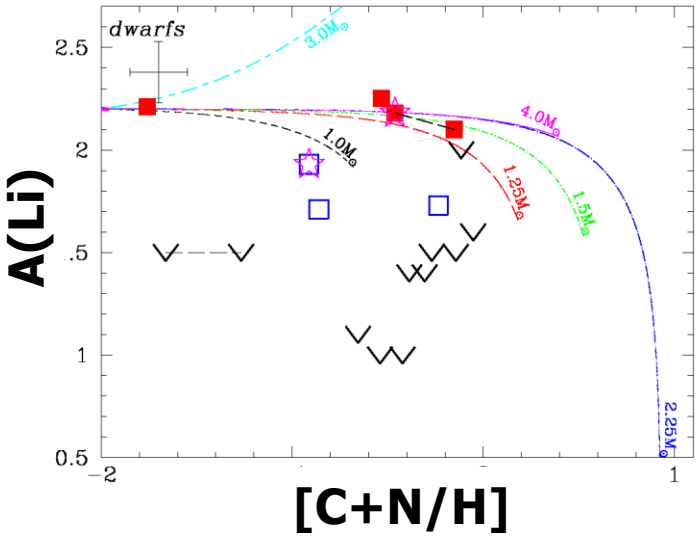
Caffau et al. (2012)



Keller et al. (2014)

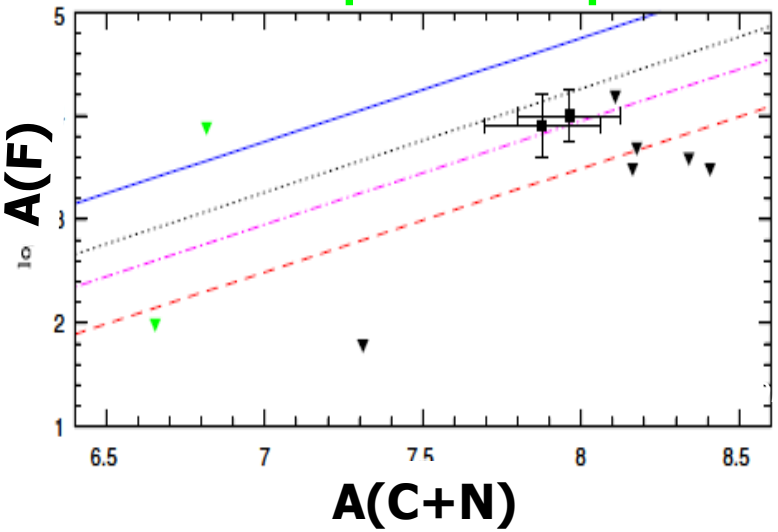
Contraintes sur la modélisation des AGB

Mass & rotation



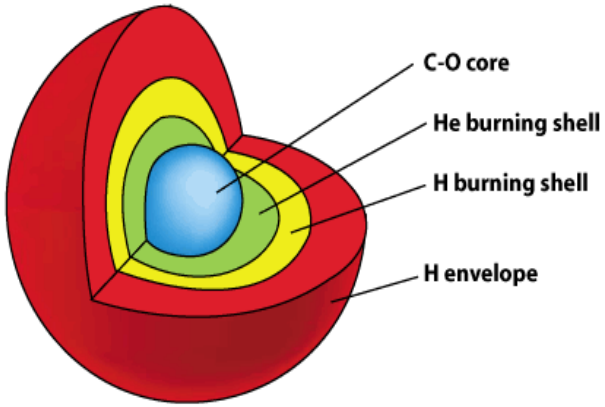
Masseron et al. (2012)

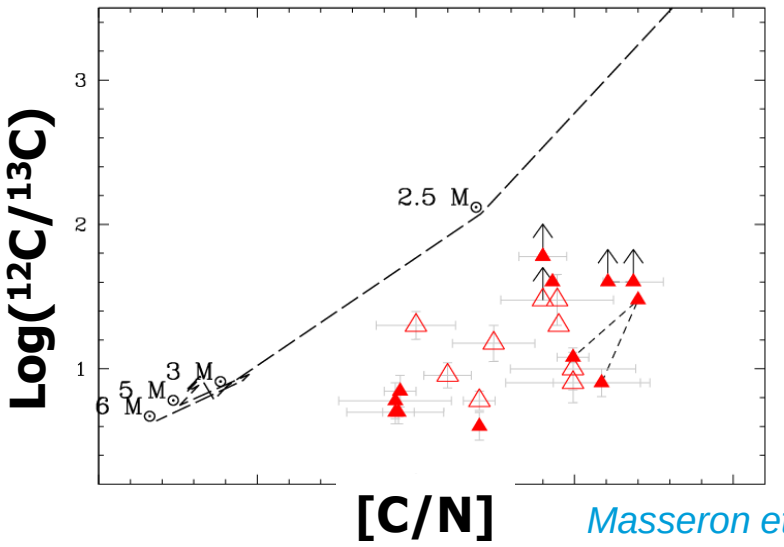
neutron & proton exposure



Lucatello et al. (2011)

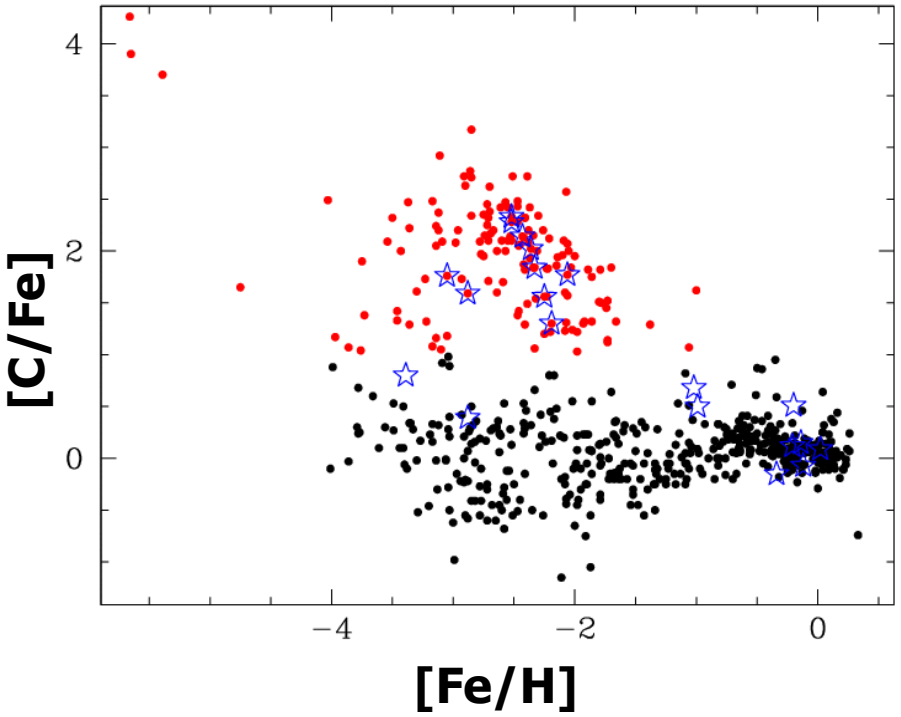
mixing

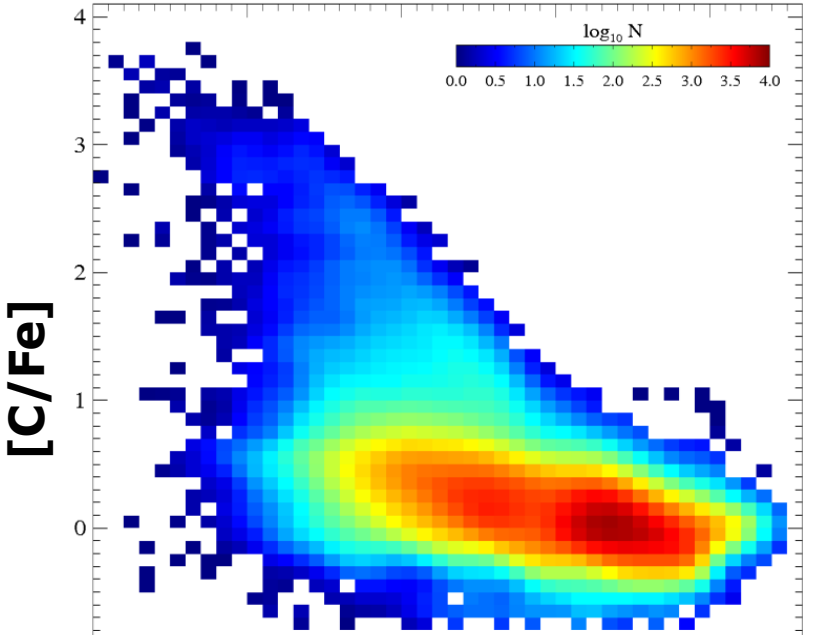




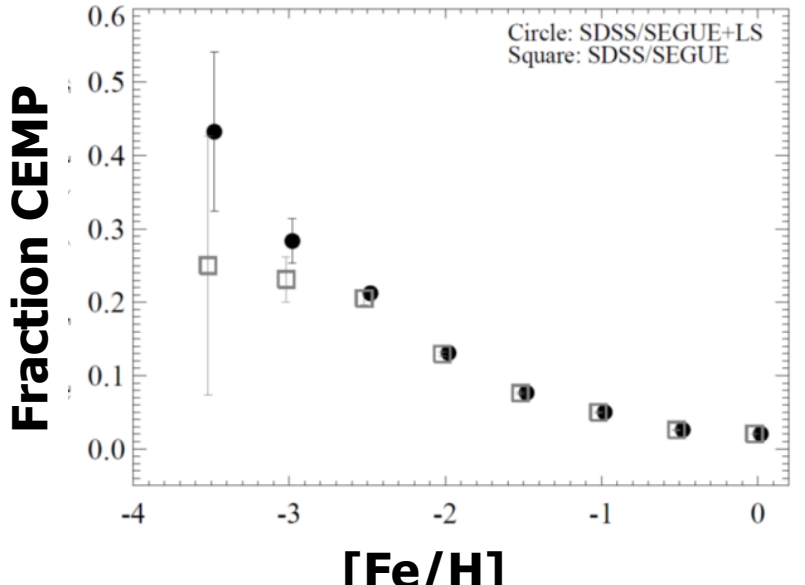
Masseron et al. (2010)

Contraintes sur l'évolution du halo de la Galaxie





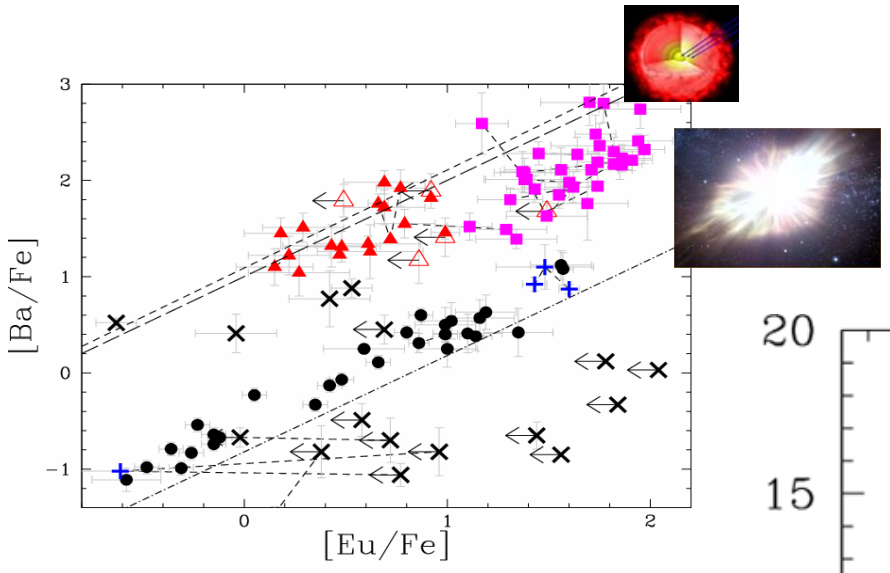
Lee et al. (2013)

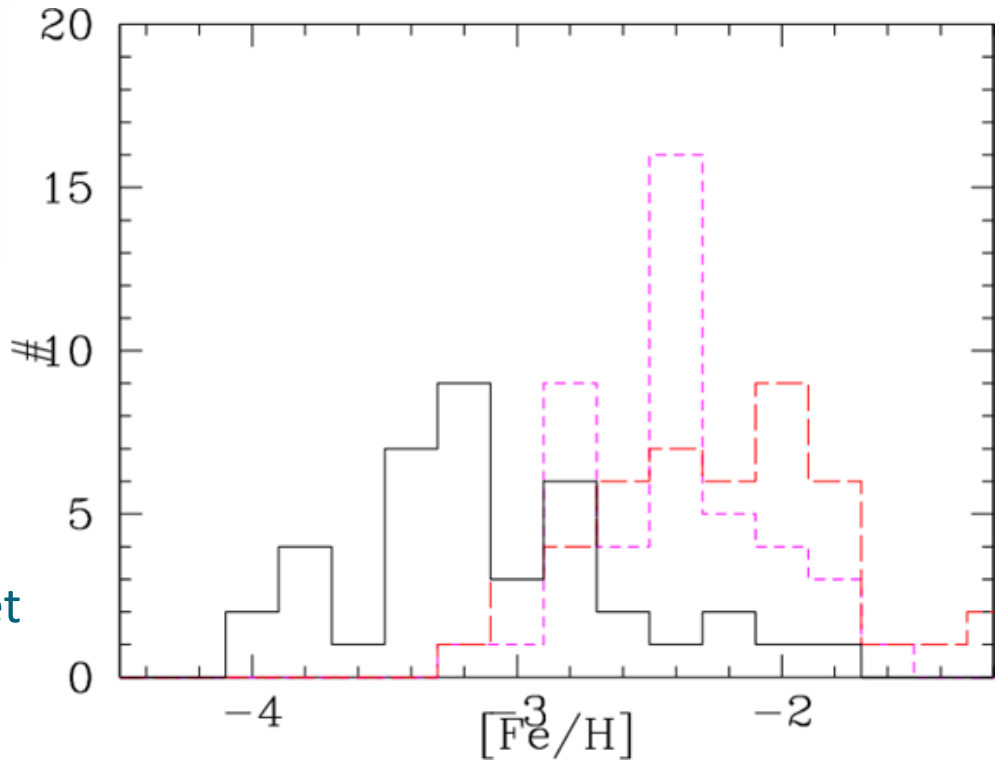


Conclusions

A quoi ressemblaient les premières étoiles ?

Quelle est la contribution exacte des AGB et des SN ?





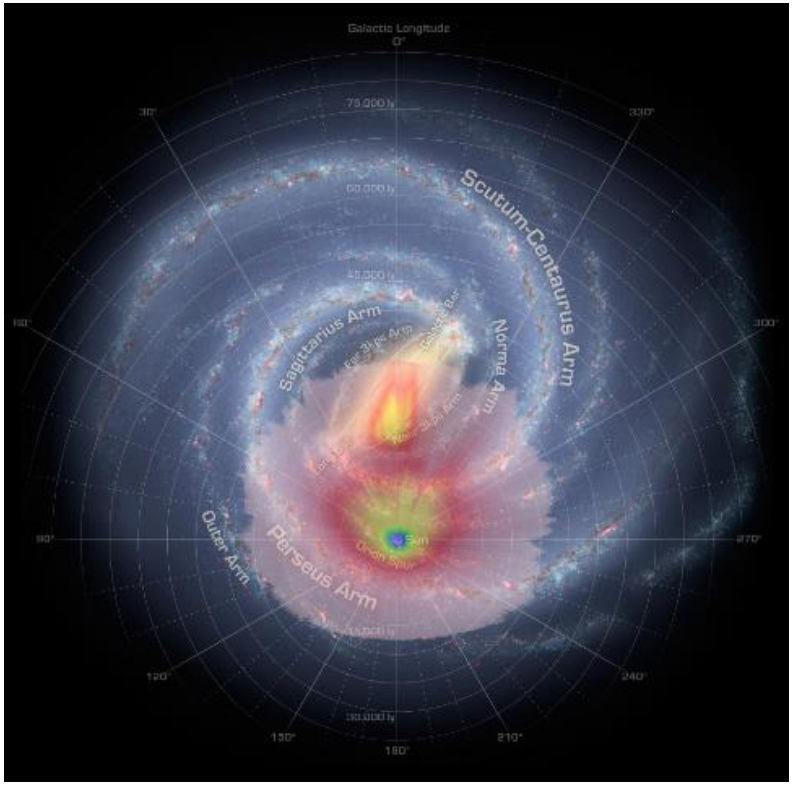
Où sont les premières AGB ? AGB effet de métallicité sur la nucléosynthèse ?

Prospectives I: Grands relevés spectroscopiques

- SDSS/SEGUE (visible,basse)
- APOGEE (IR,basse)
- RAVE(visible, basse)
- Gaia-ESO (visible, haute)

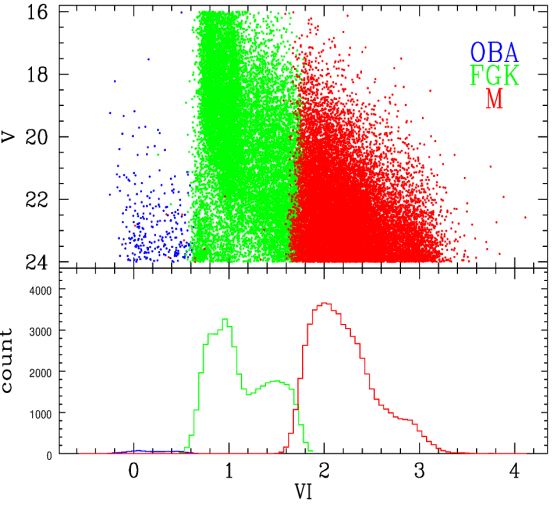
A venir

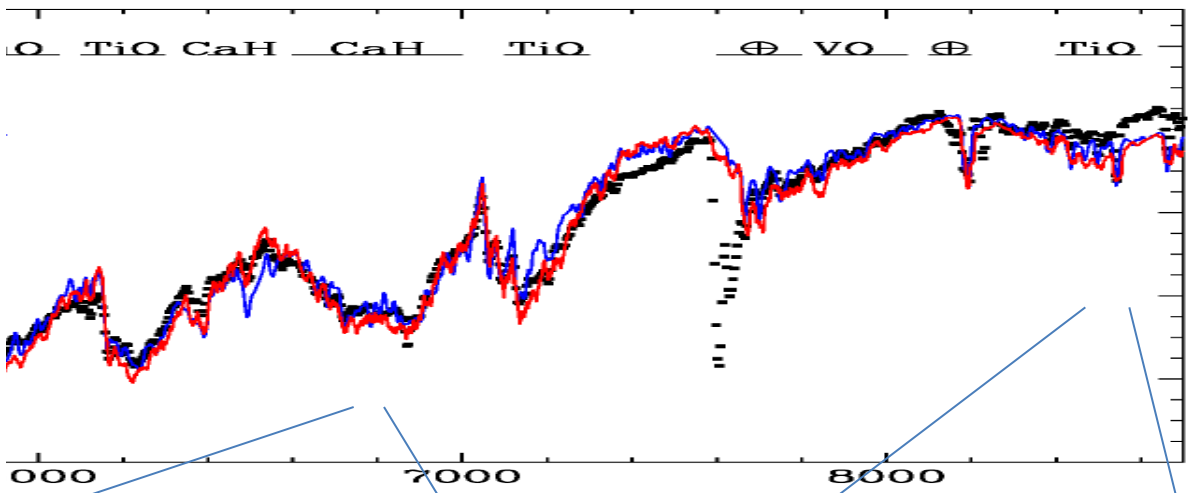
- Gaia (visible, basse)
- 4most (visible haute)
- GALAH (visible, haute)
- LAMOST (visible, basse)



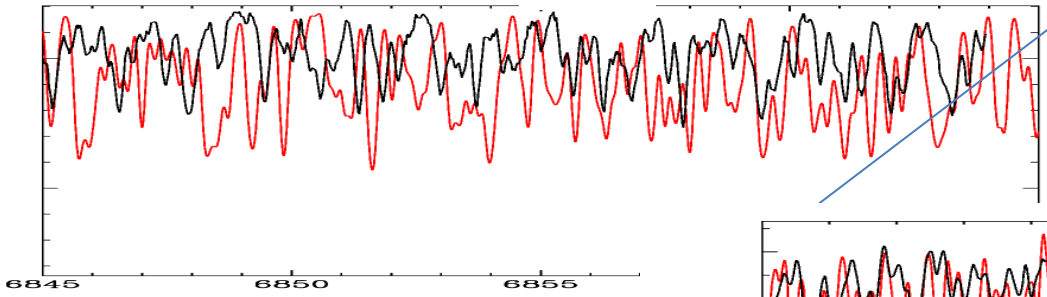
Mais il faut traiter proprement ces grandes quantités de données!

Prospectives II: Modélisation des étoiles froides



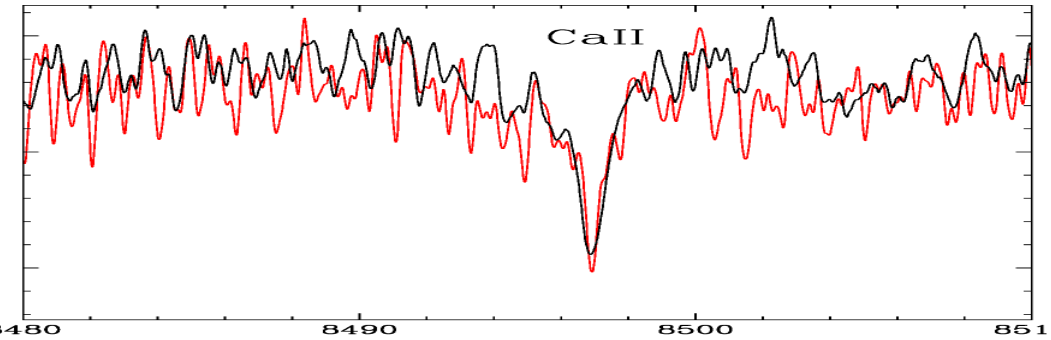


Besancon simulation (A. Robin courtesy)

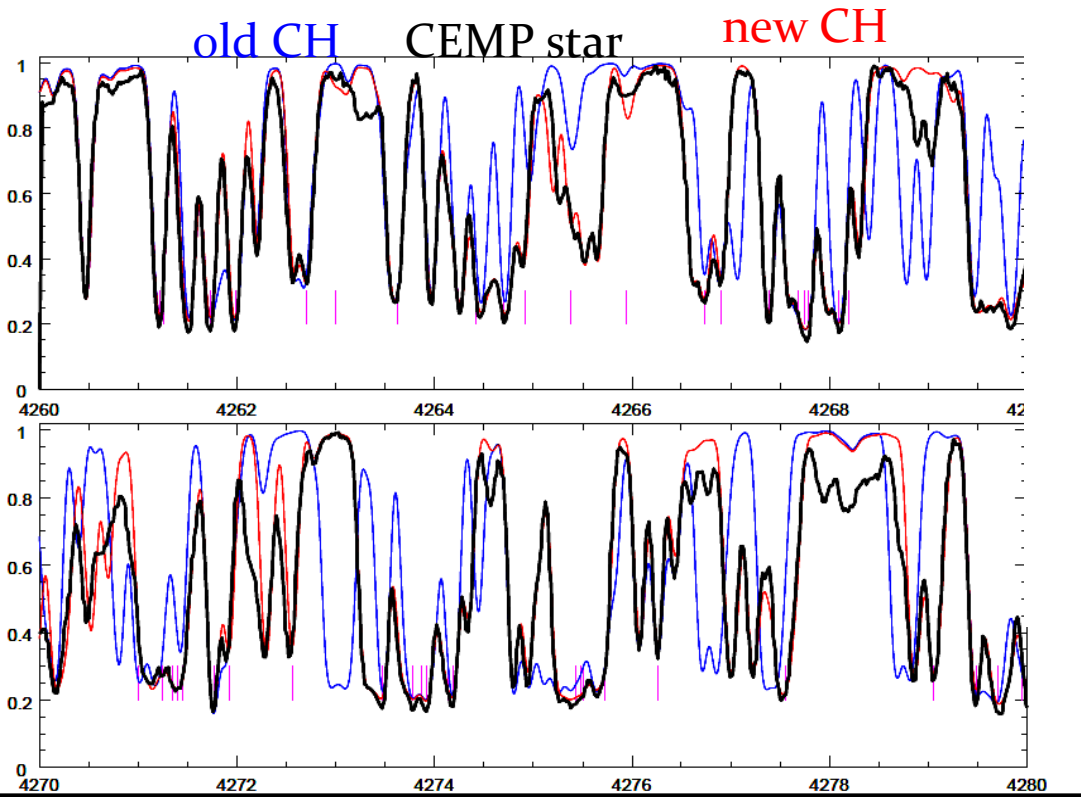


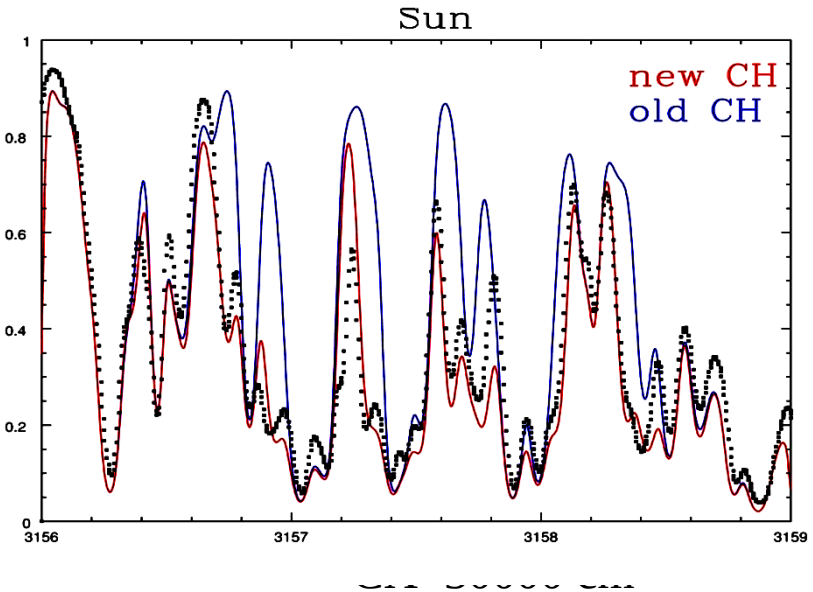
CaH

TiO in RVS



Modélisations de quelques molécules





…De leurs isotopologues…

Et potentiellement inclure les facteurs de Landé