

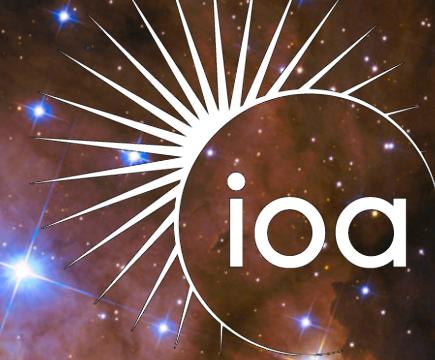


# CAN THE CHEMICAL EVOLUTION OF THE GALAXY SOLVE THE MYSTERY OF OXYGEN IN RED GIANTS?

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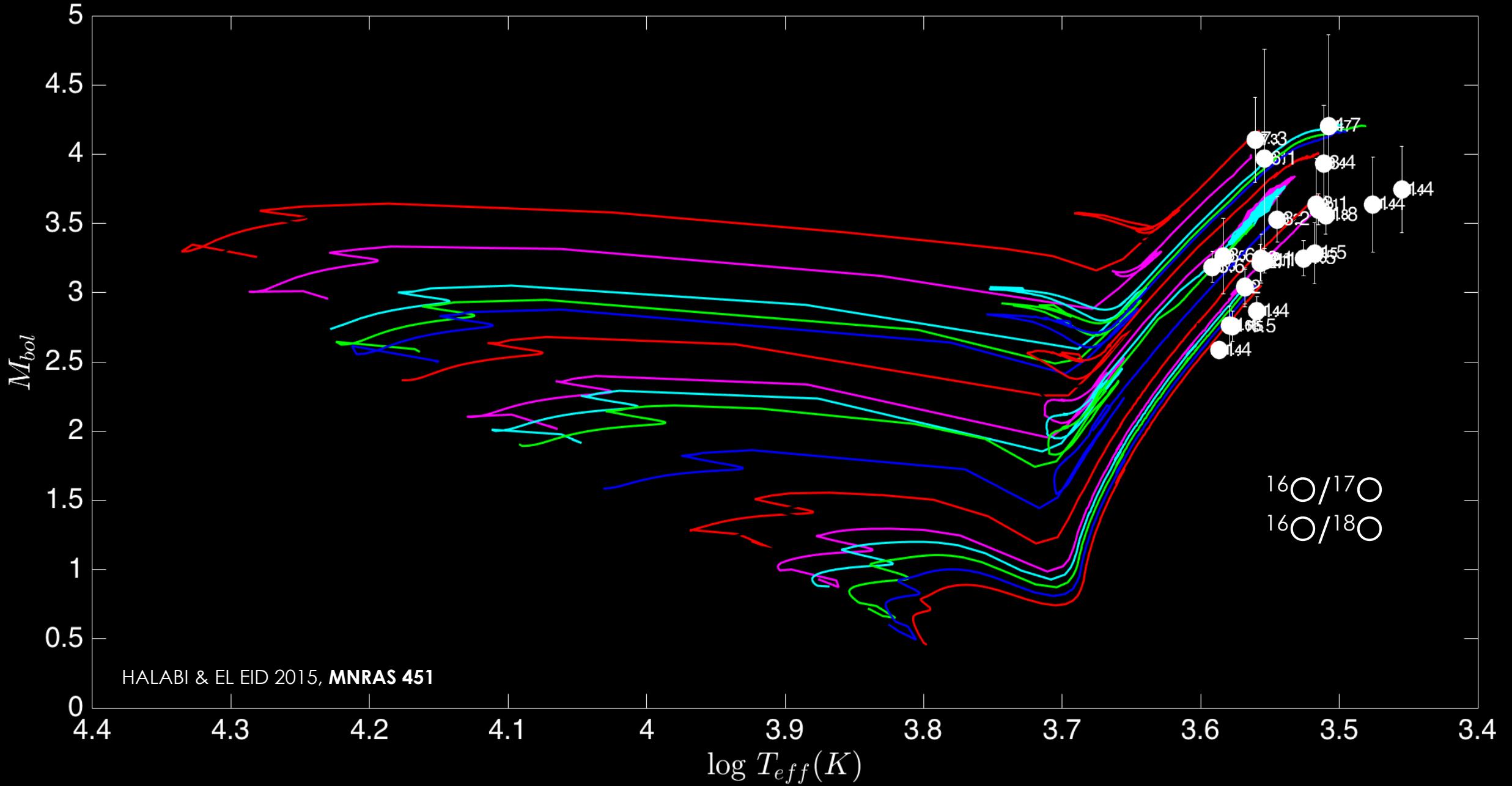
NAM, Hull, UK  
July 4 2017

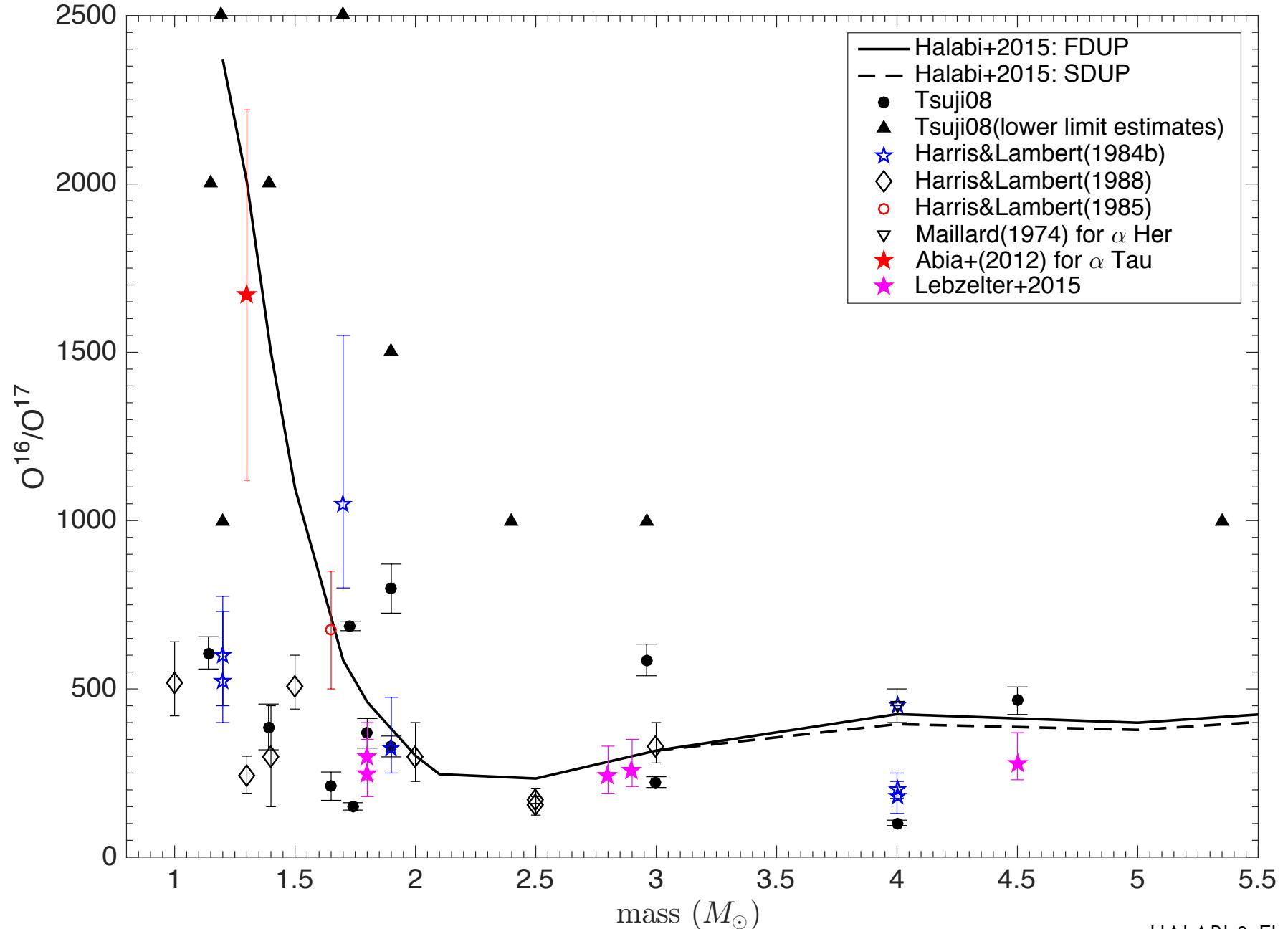


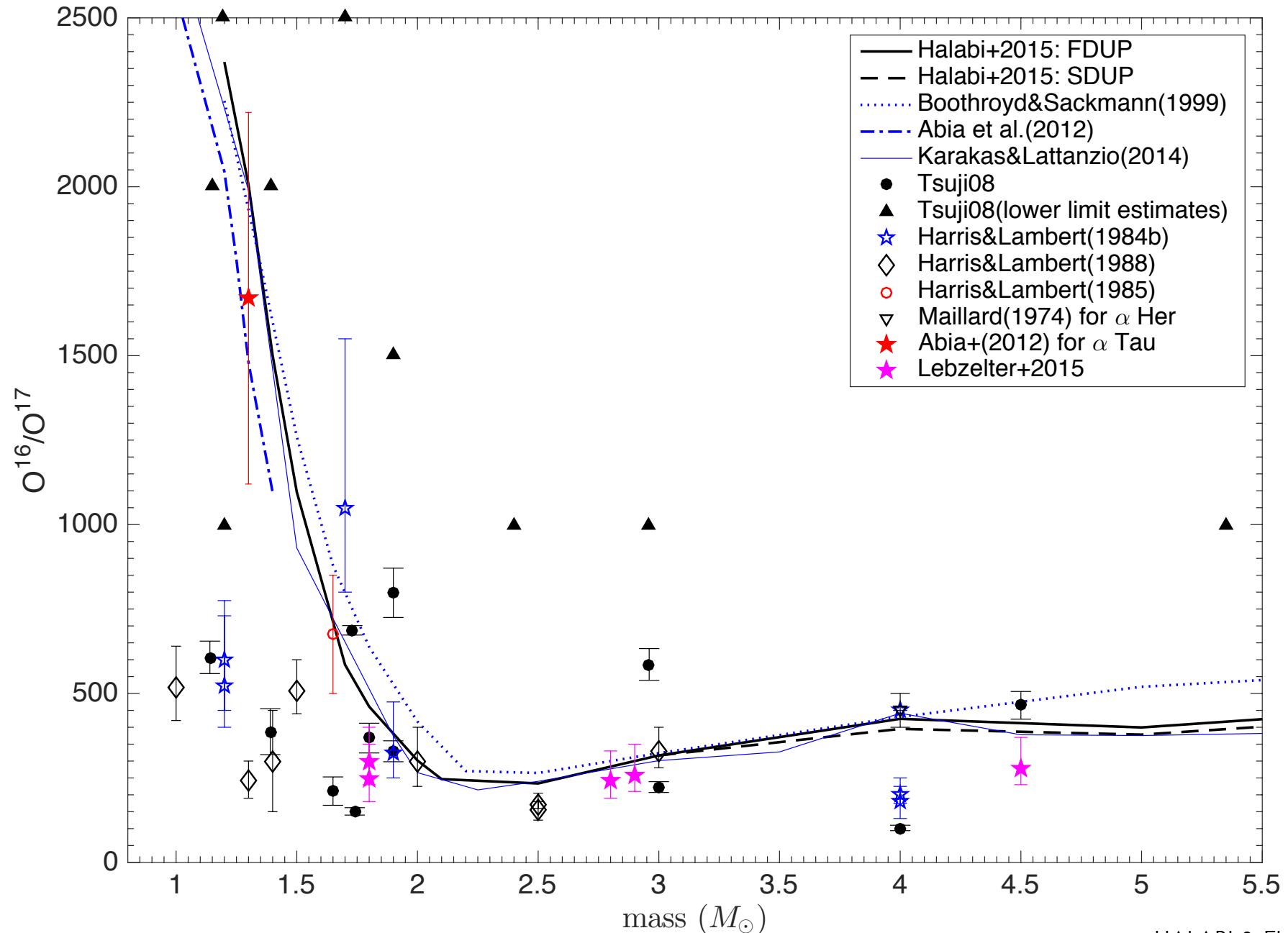


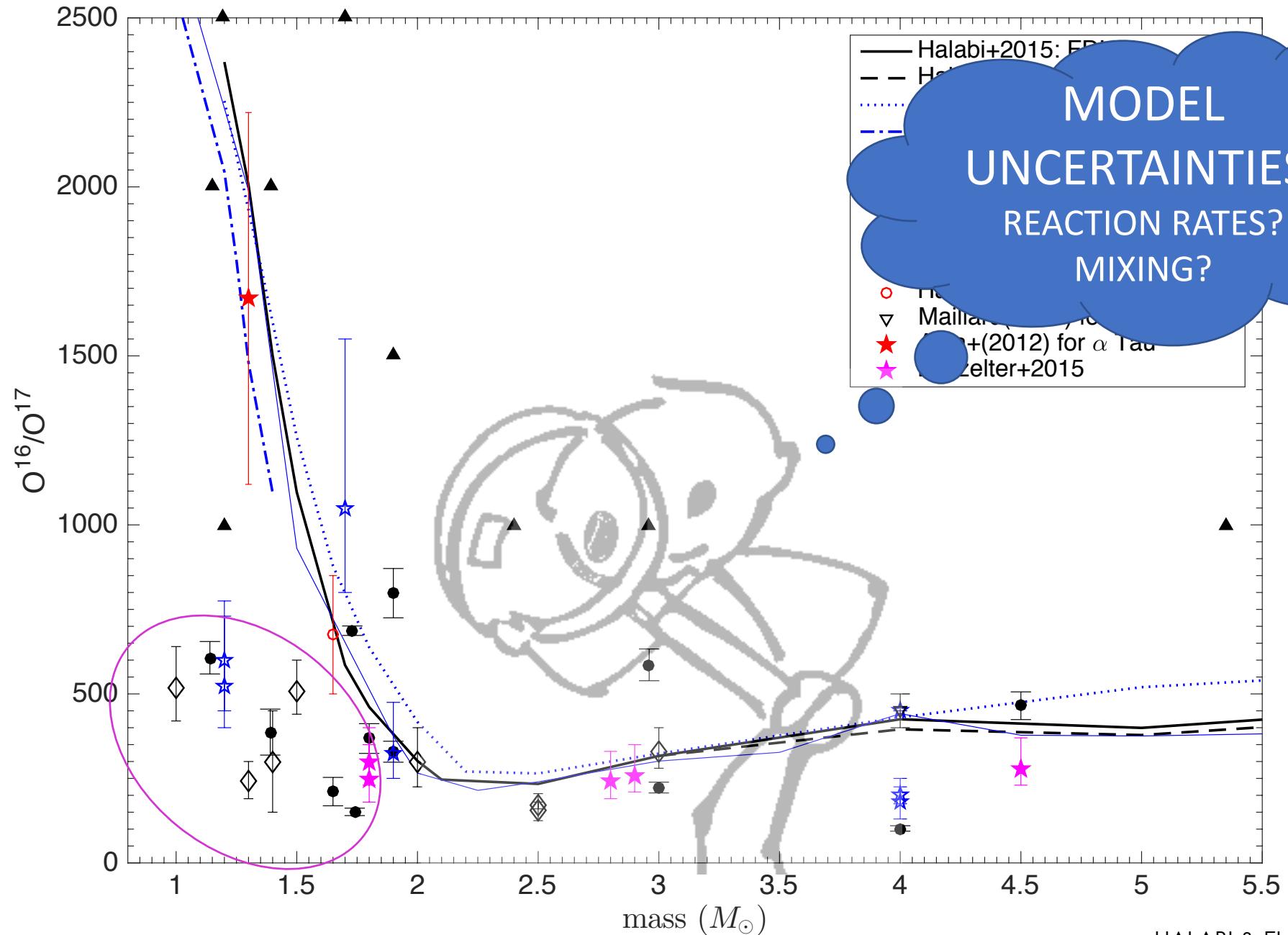
MASSES?  
COMPOSITION?

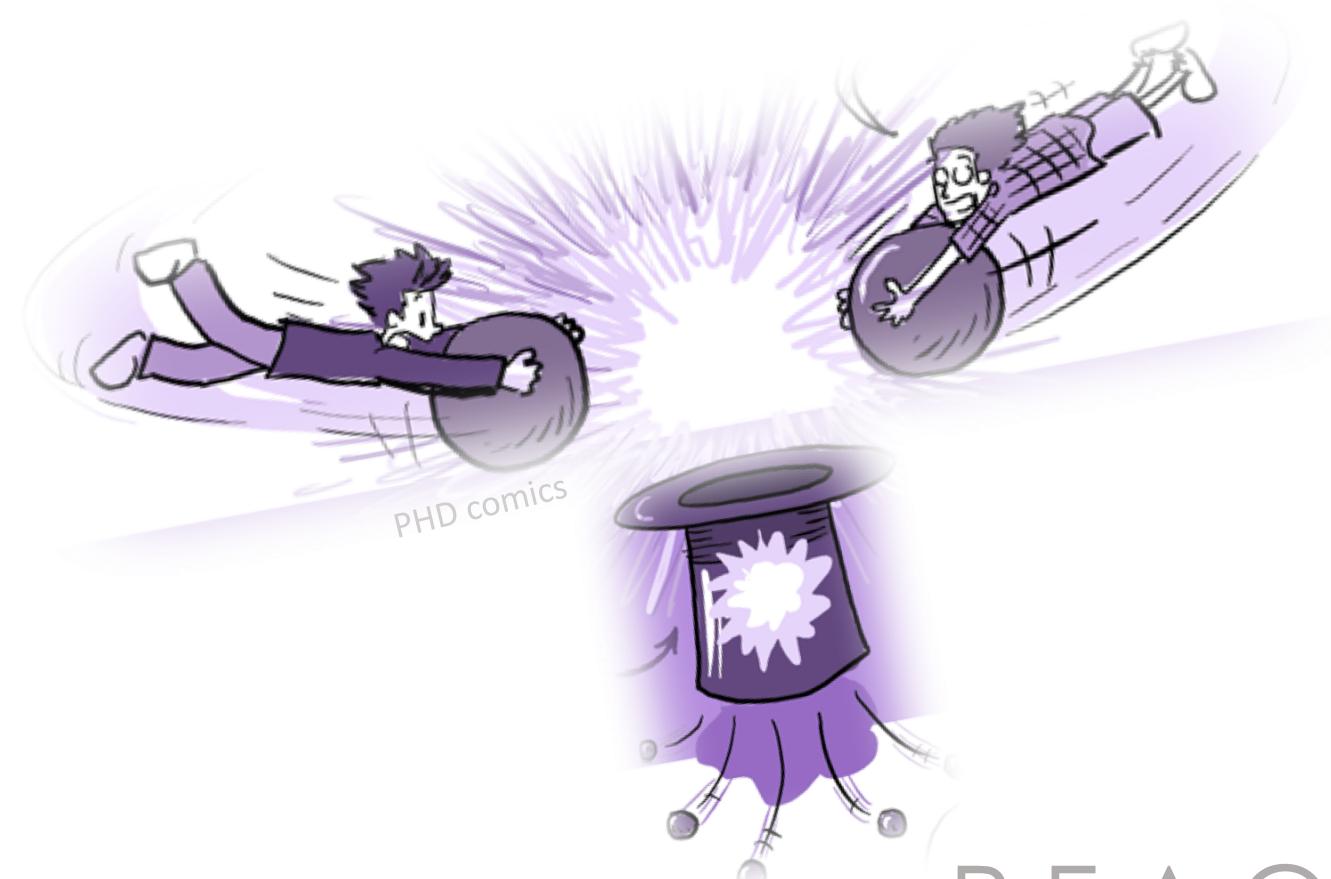
NGC 6362, ESO



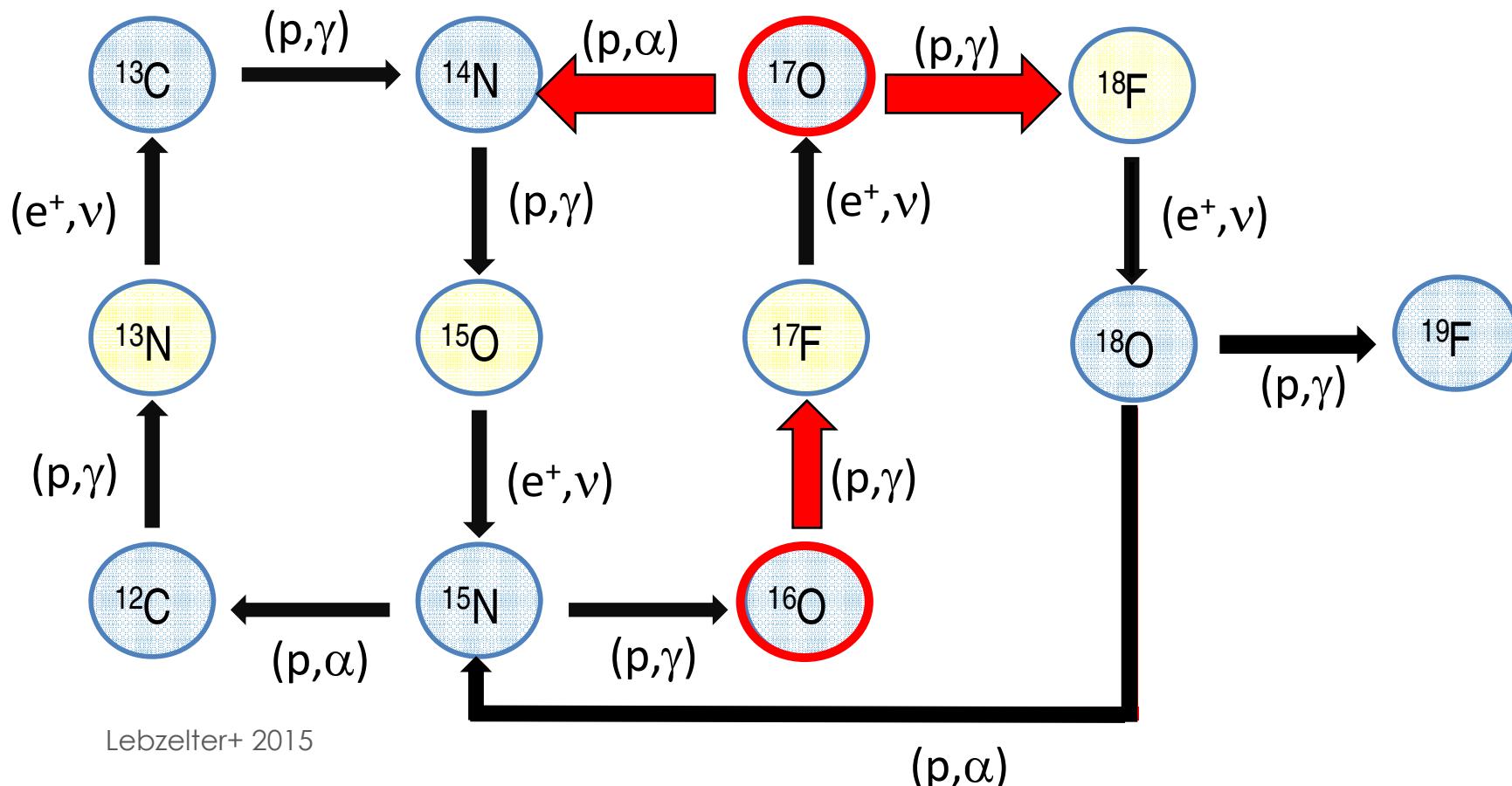




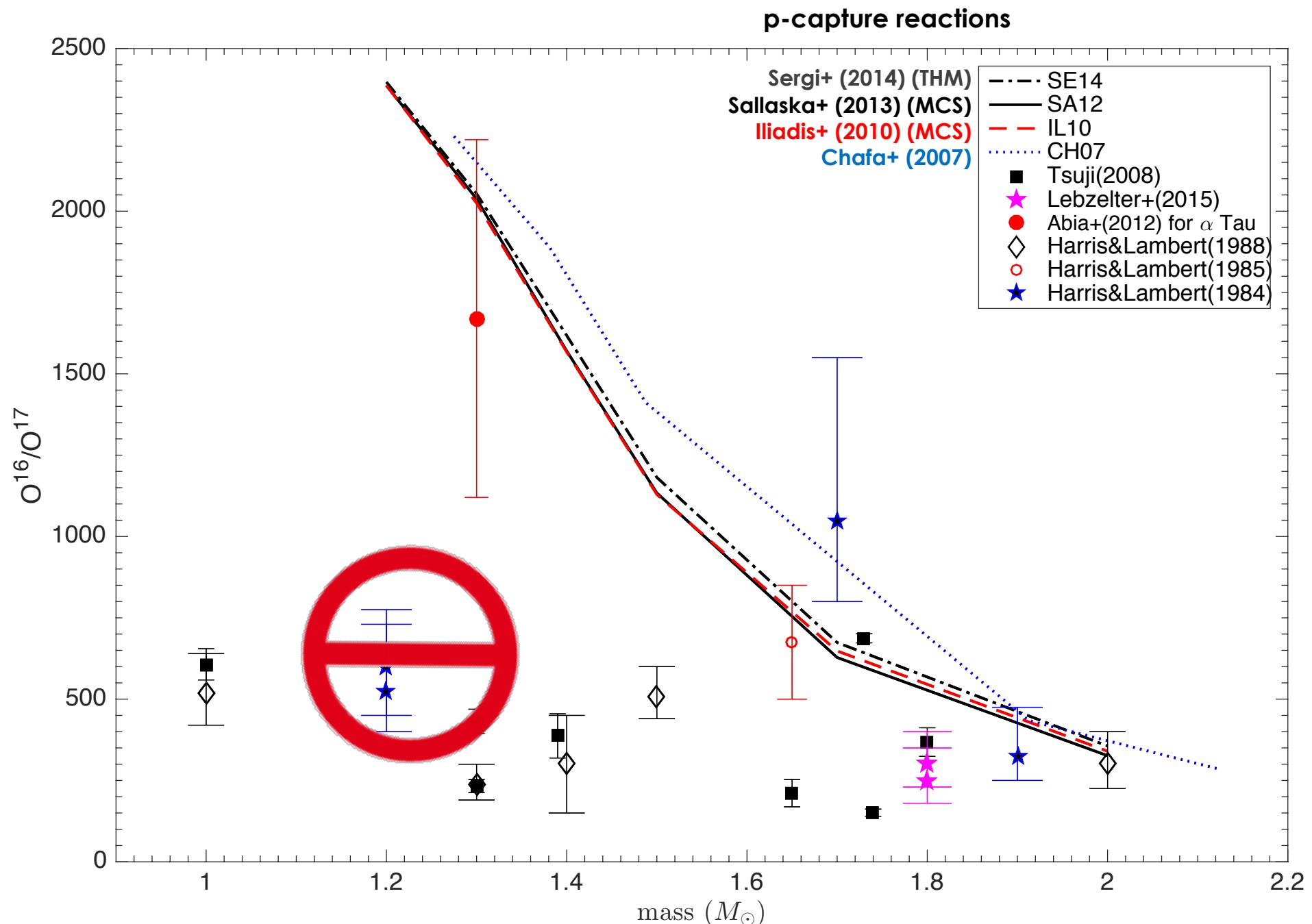


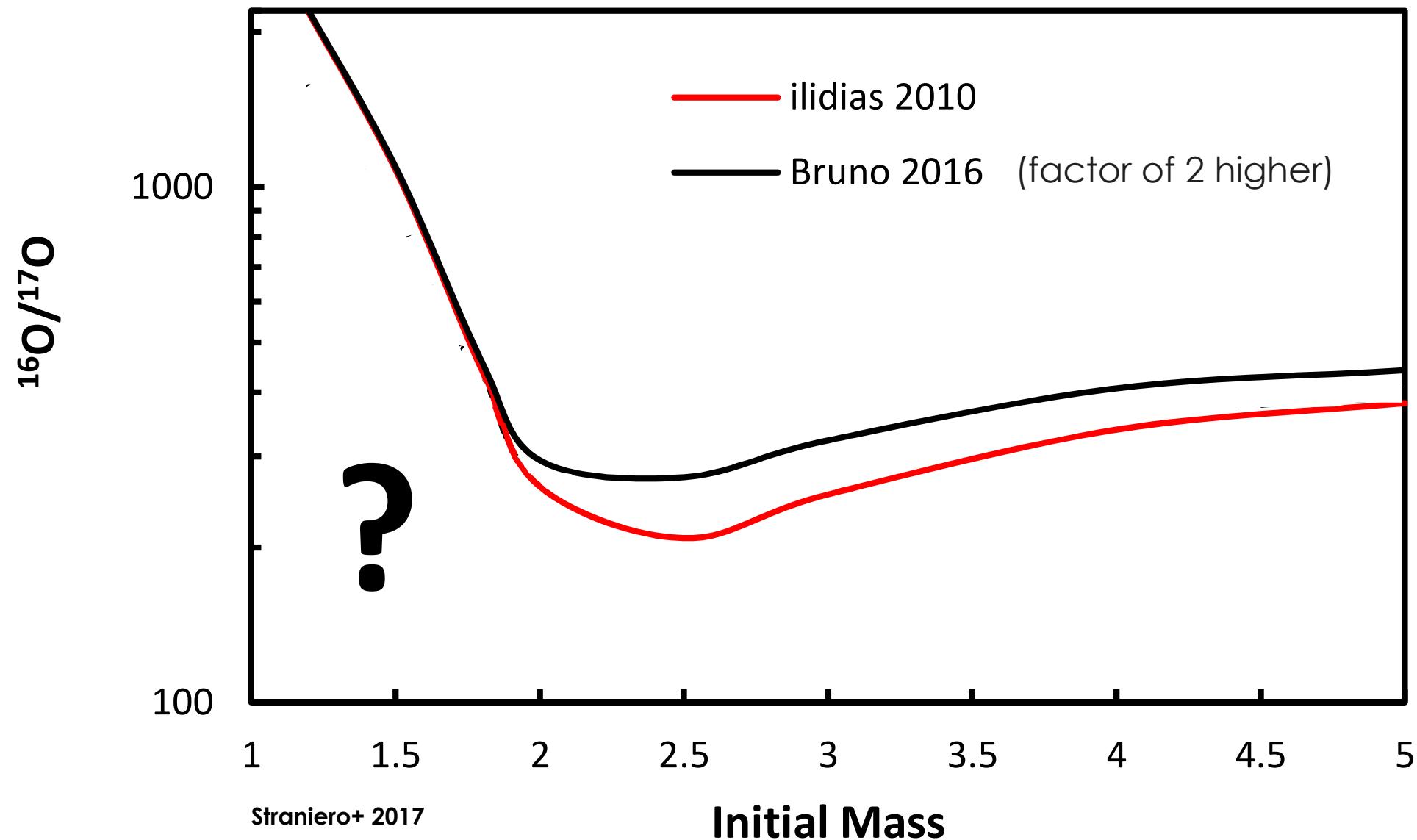


REACTION RATES

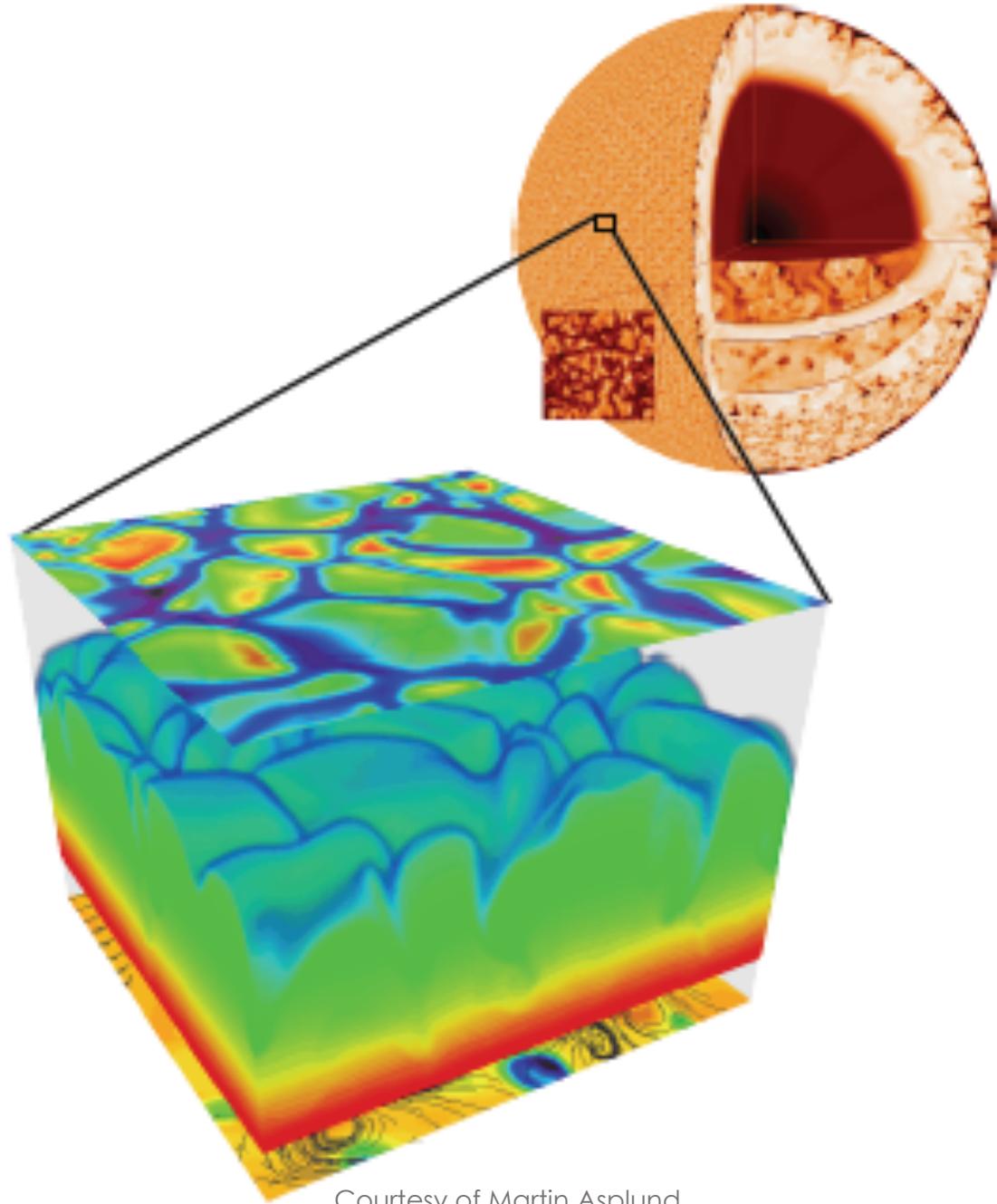


Lebzelter+ 2015

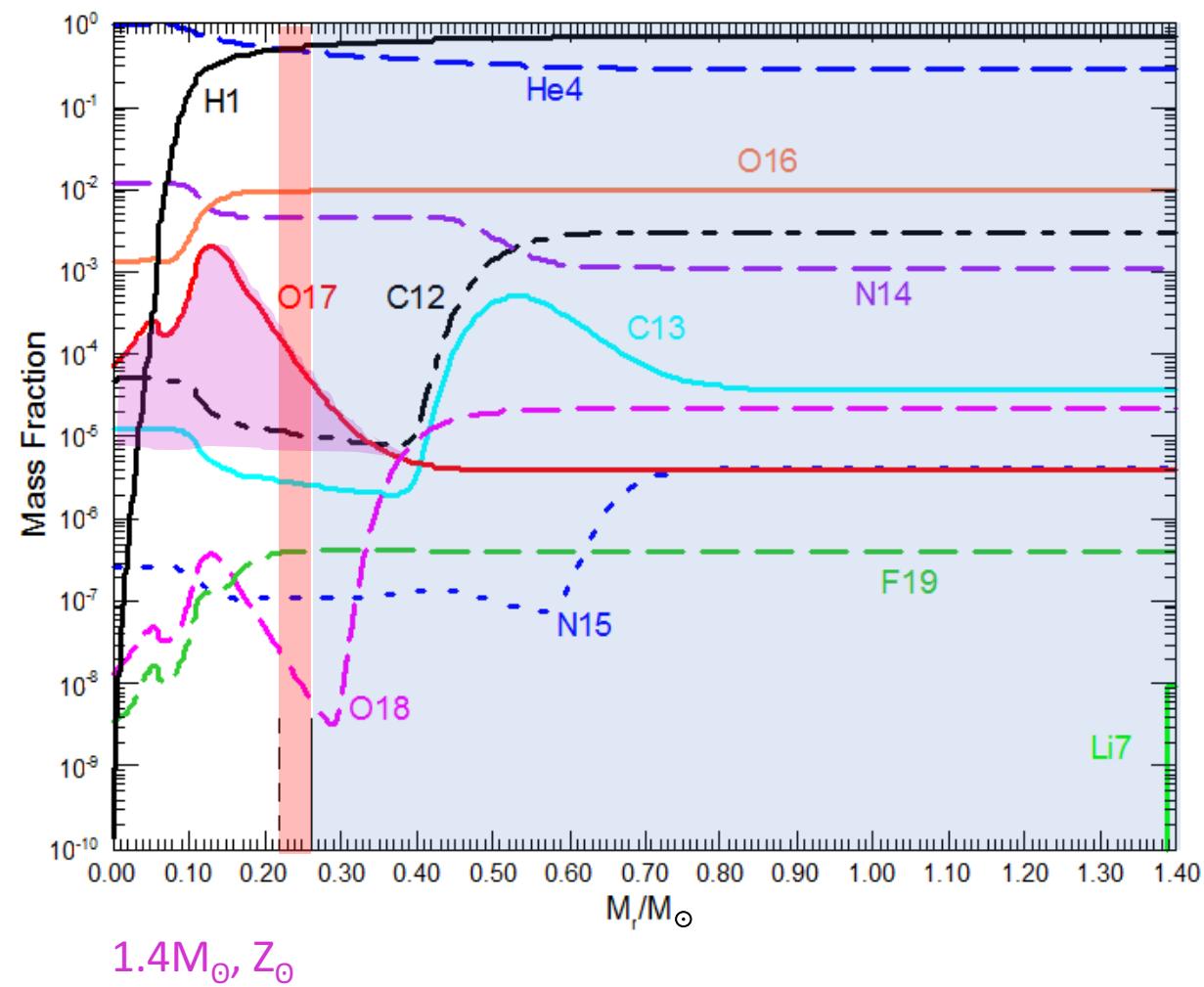




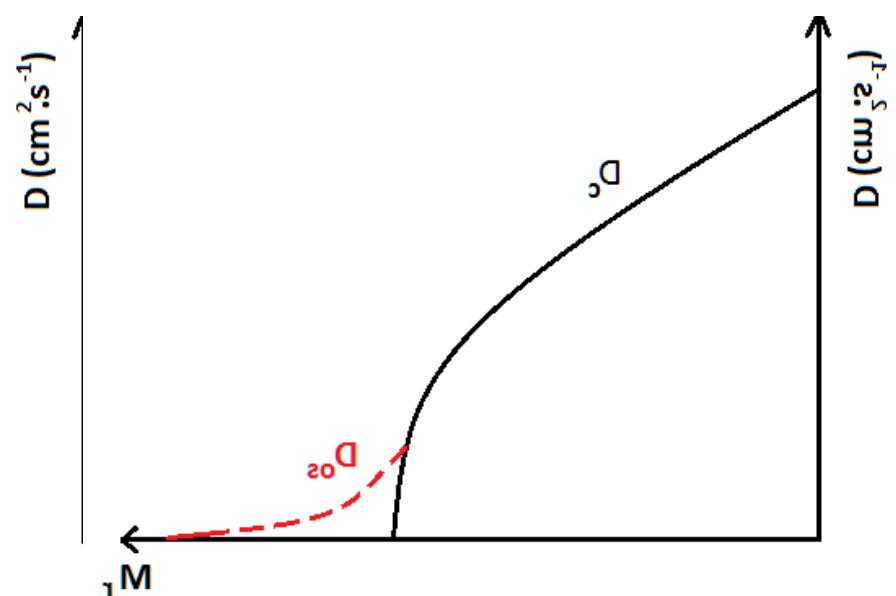
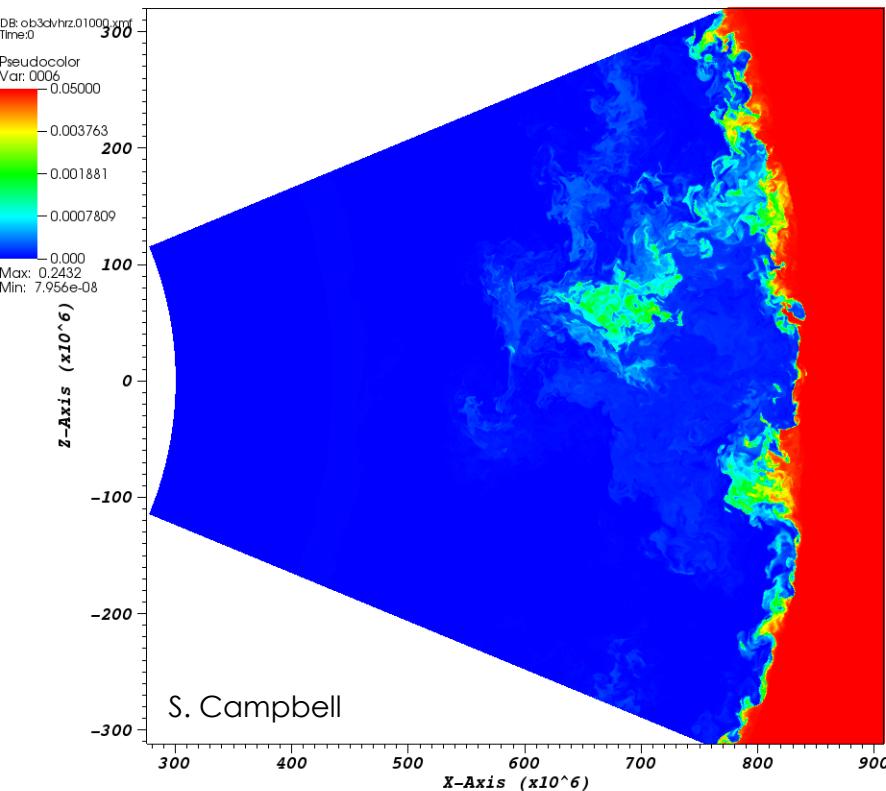
# MIXING



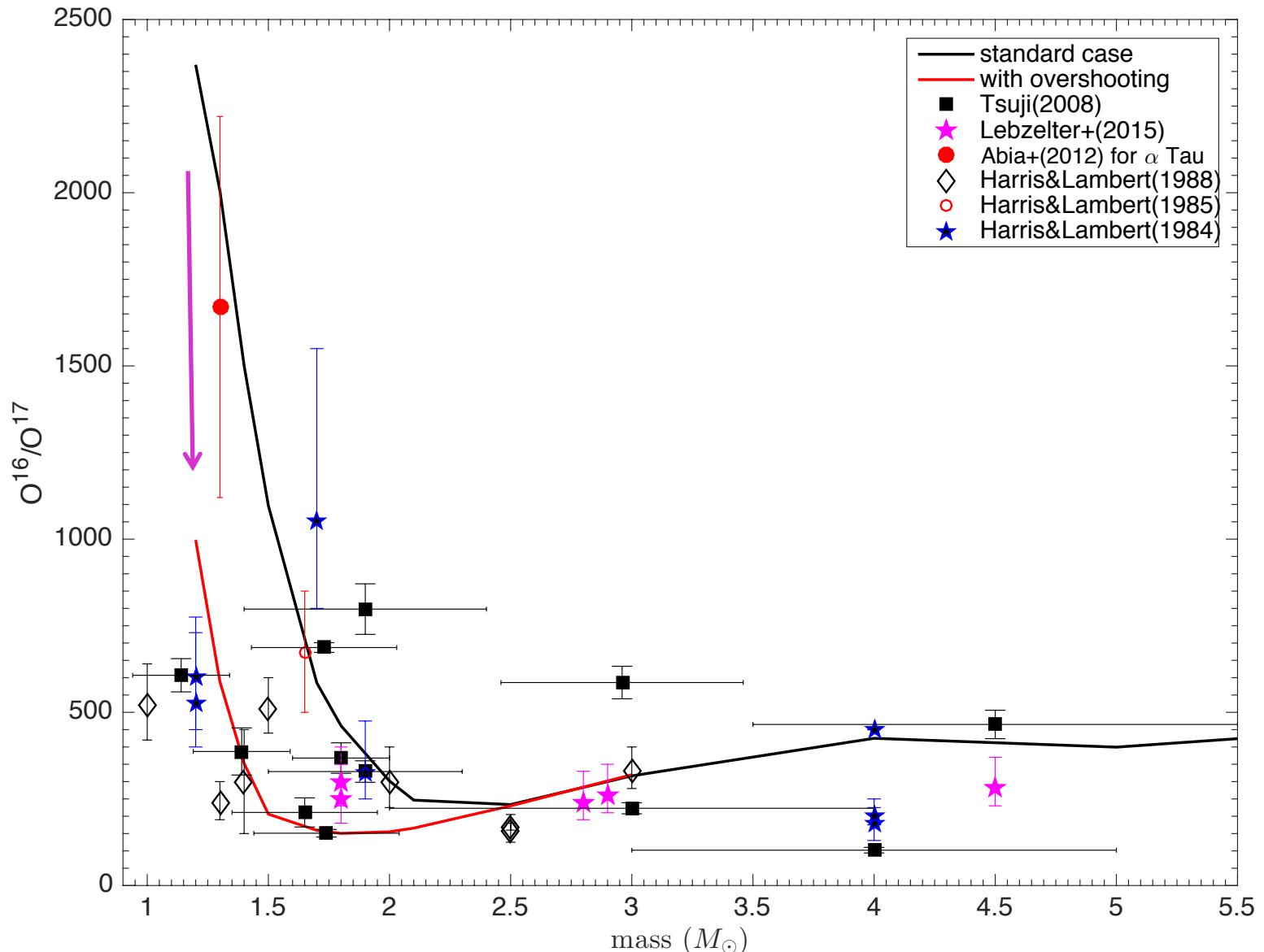
Courtesy of Martin Asplund



overshooting

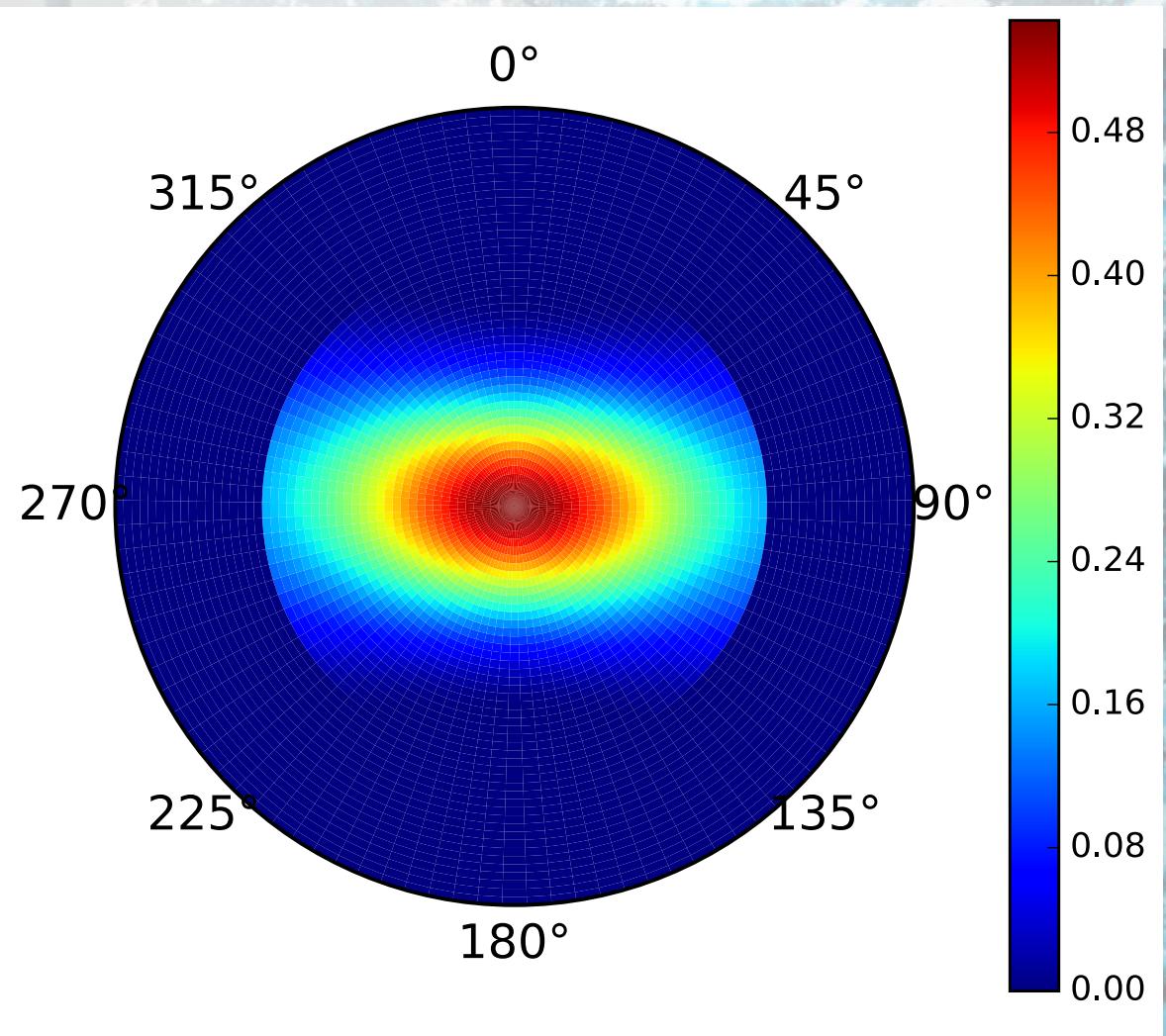
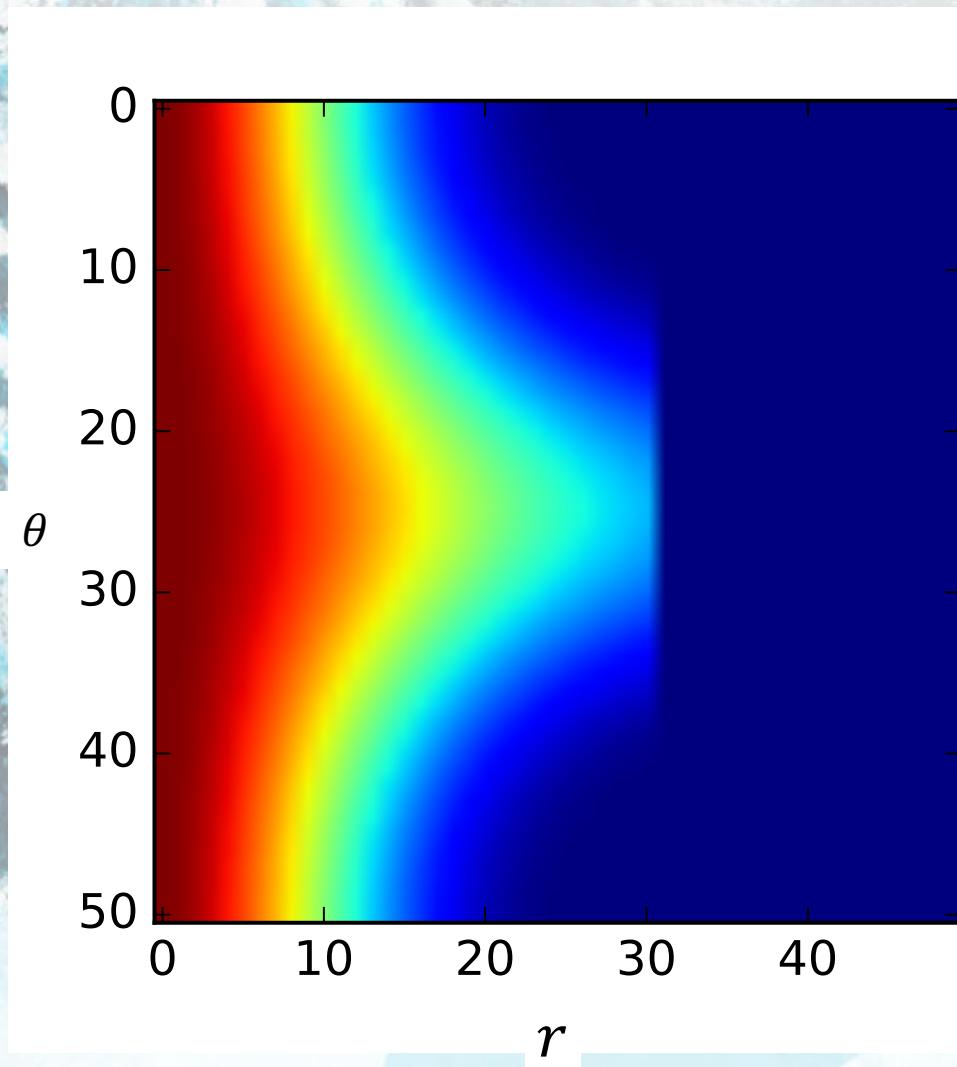


# $^{16}\text{O}/^{17}\text{O}$ with overshooting

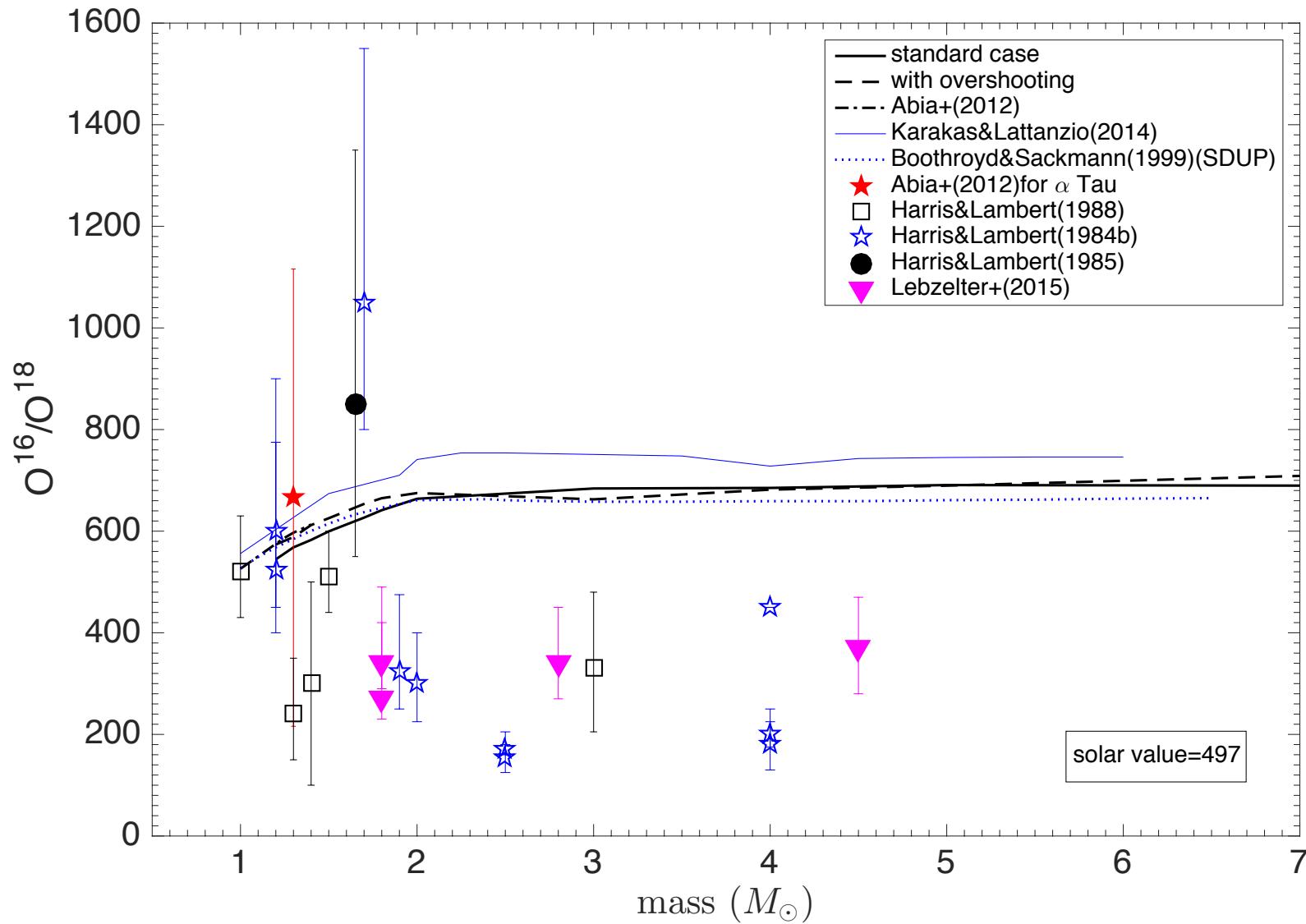


# Towards a better way of modelling evolution & mixing: **2DStars**

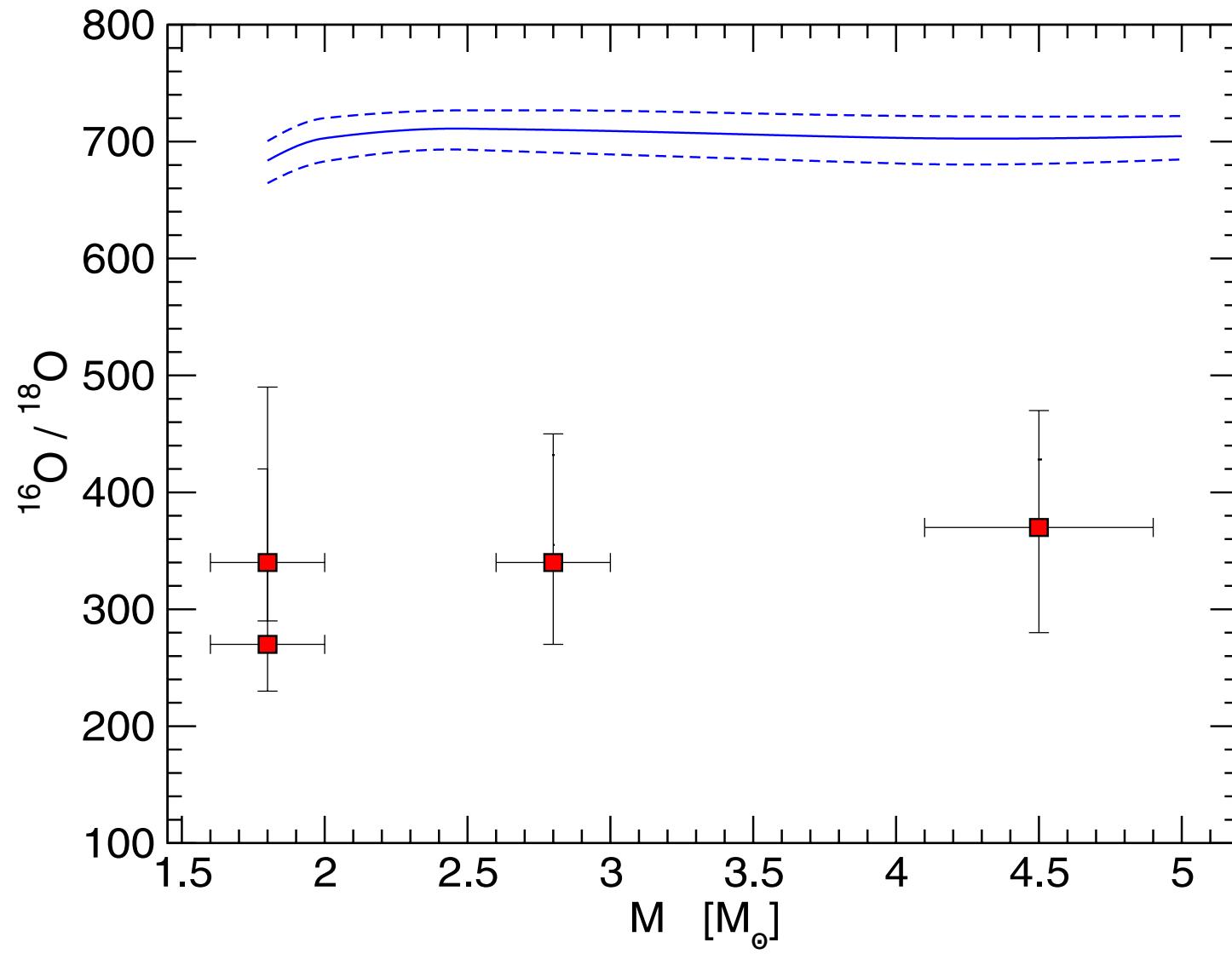
(Very) first results: density distribution in a fast rotating star



.. and  $^{16}\text{O}/^{18}\text{O}$

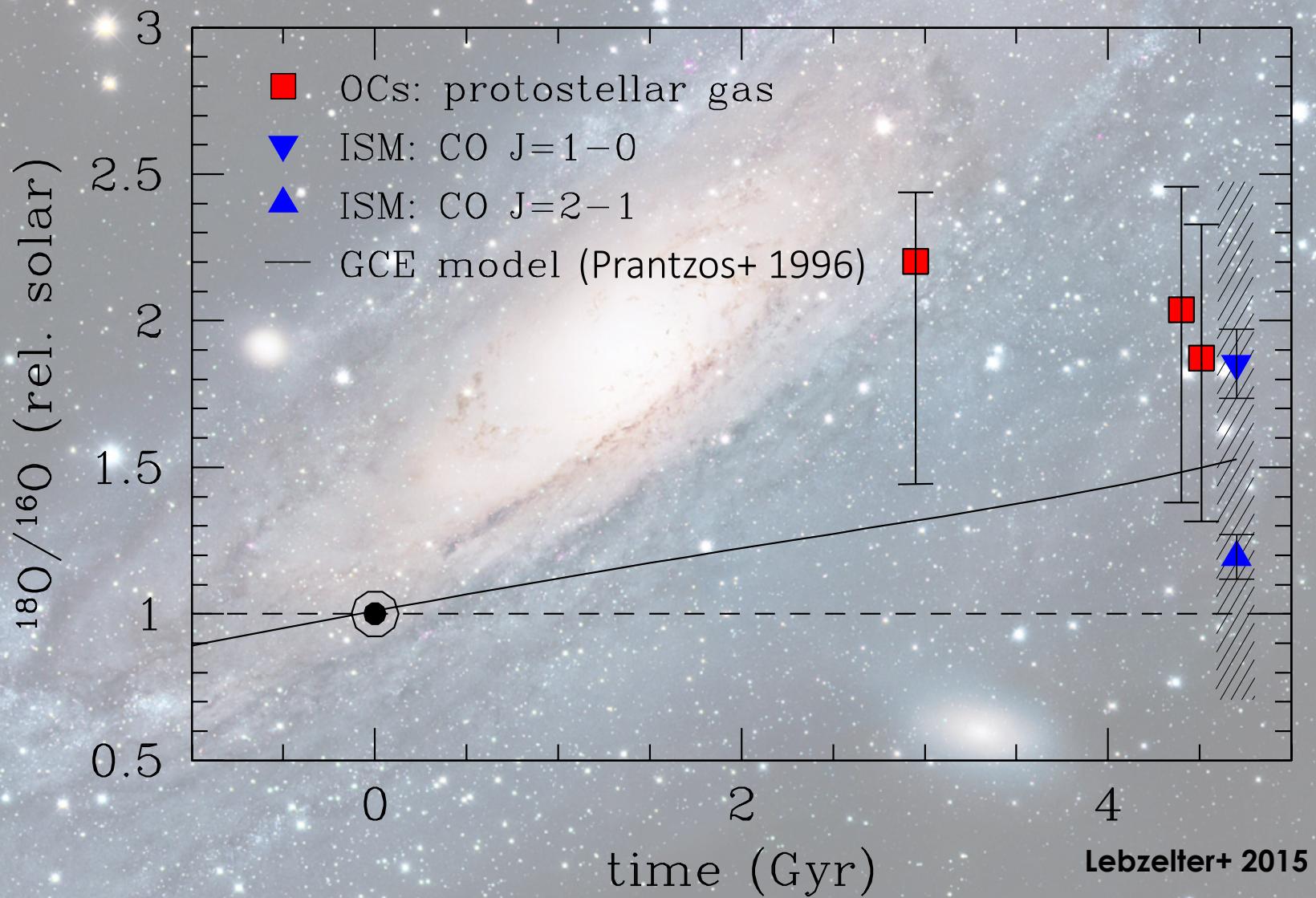


.. and  $^{16}\text{O}/^{18}\text{O}$

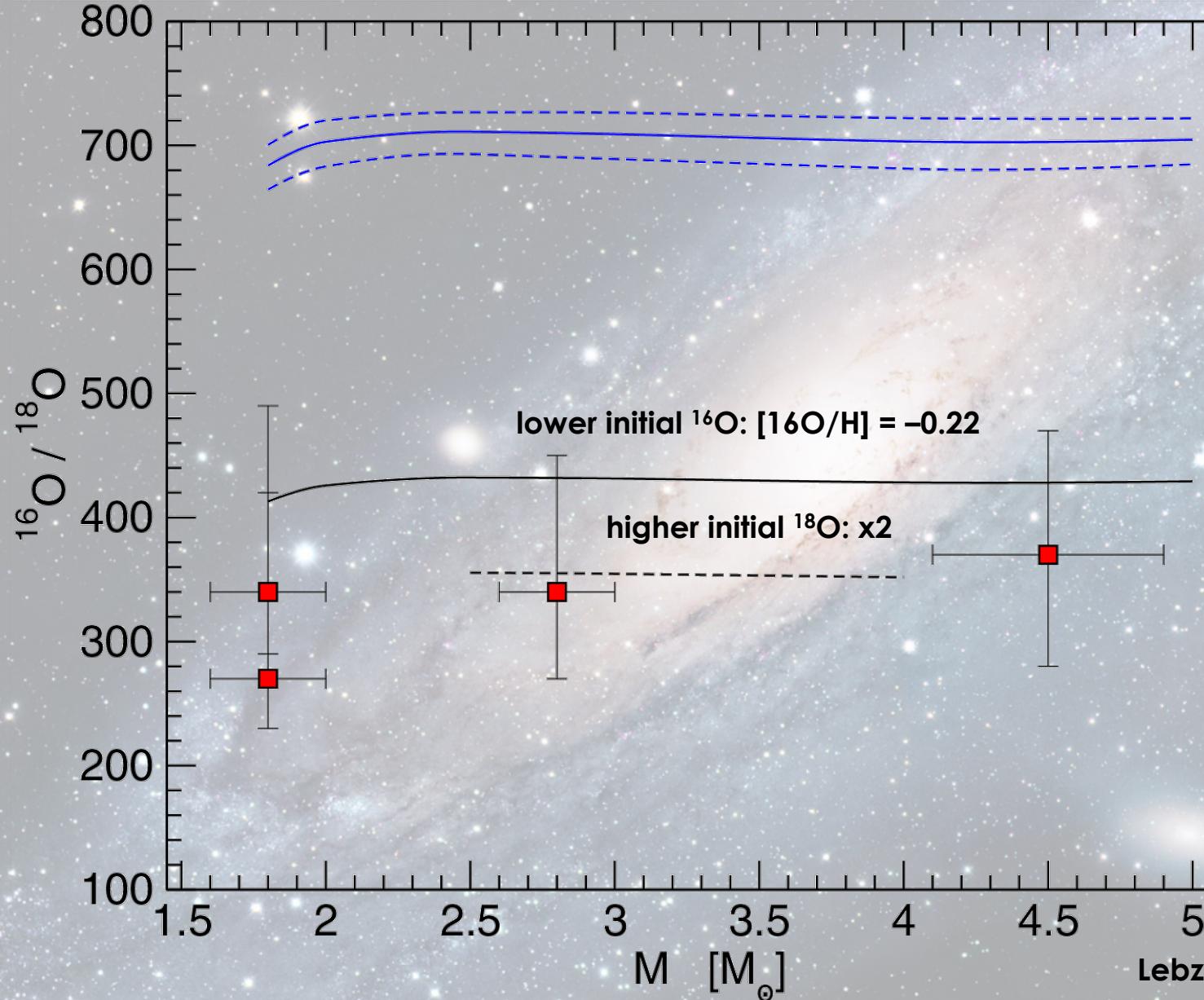


Lebzelter+ 2015

# Insight from GCE



# Stellar models with modified initial abundances



Super-solar  $^{18}\text{O}$   
↓  
enhancement in  $^{17}\text{O}$   
↓  
otherwise  
 $^{18}\text{O}/^{17}\text{O}$  is too large

## CONCLUSIONS

$^{16}\text{O}/^{17}\text{O}$  and  $^{16}\text{O}/^{18}\text{O}$  in RGs  
show **discrepancy** with  
observations

can **overshooting** resolve the  
discrepancy? maybe...

nuclear **reaction rates**?  
seems not!

**GCE** predictions seem to  
favour the cosmic recycling  
of matter scenario.



NGC 3603 (NASA; ESA)