The most metal-poor dwarfs of the binary CS 22876-032: Abundances and 3D effects

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Cosmological Impact of the First Stars
(CIFIST Marie Curie team)

The Milky Way Halo – Star and Gas- Locations, Motions, Origins
Bonn, 29 May – 2 June 2007

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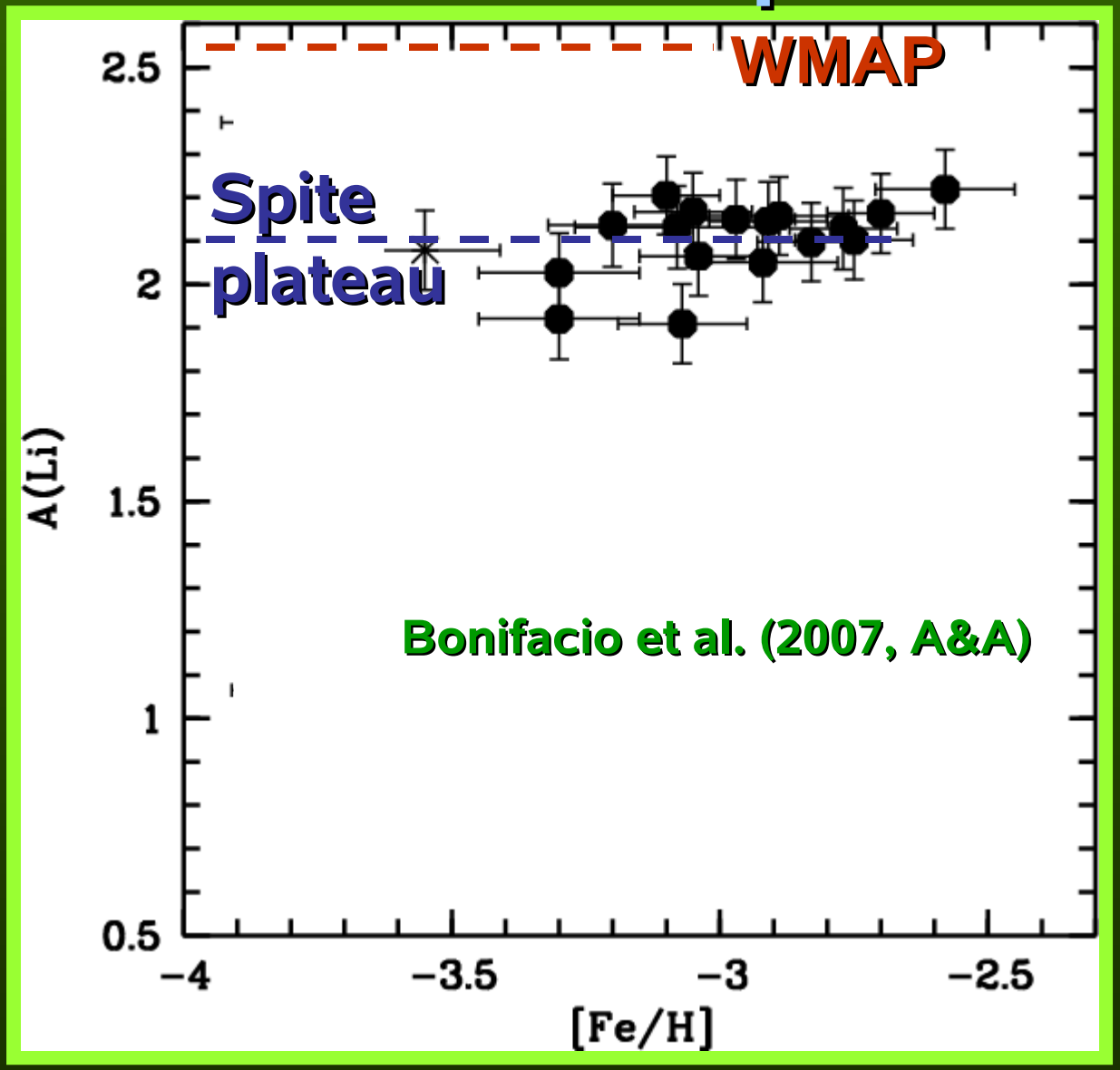
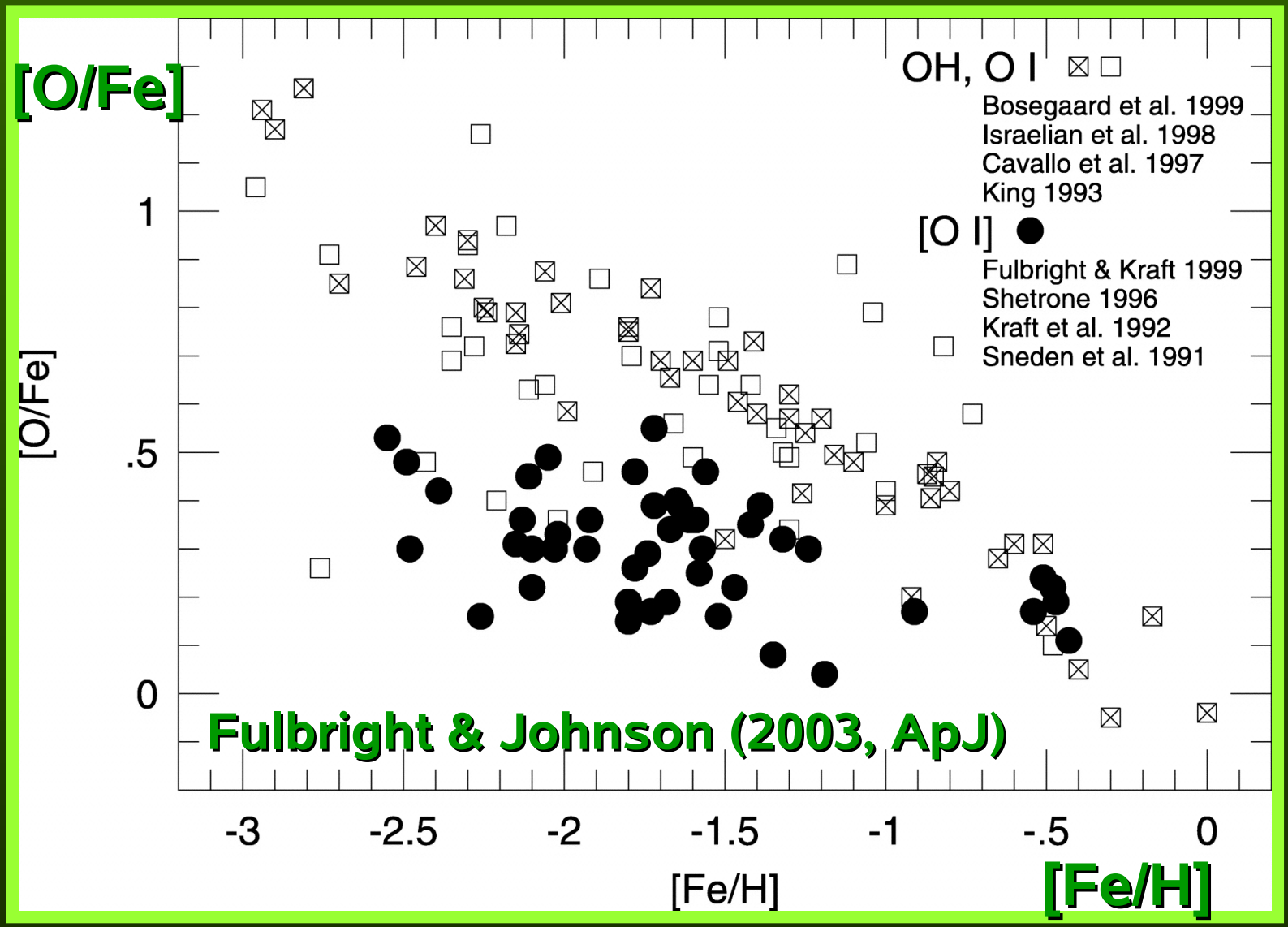
Lithium in metal-poor stars

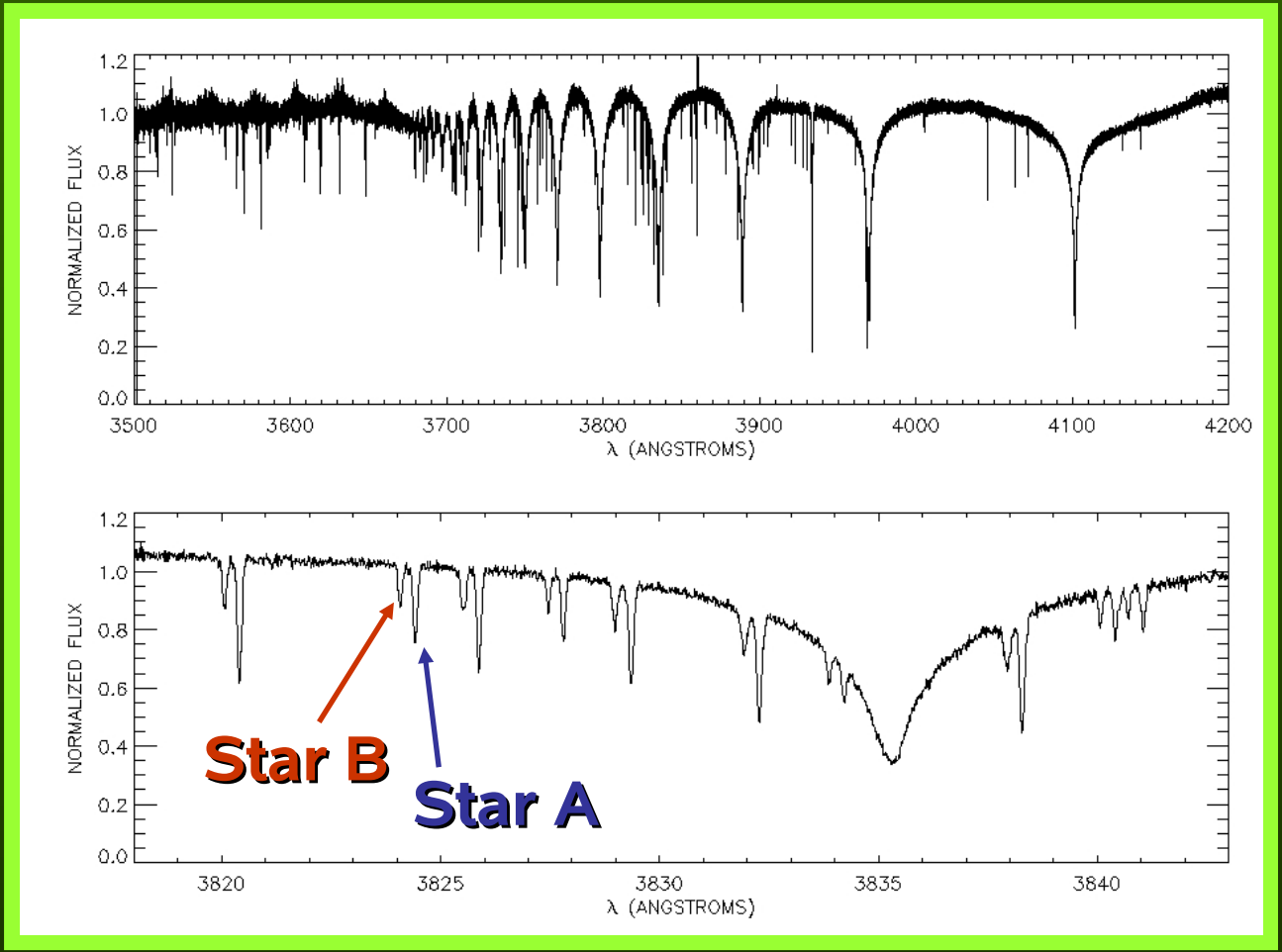


Oxygen in metal-poor stars



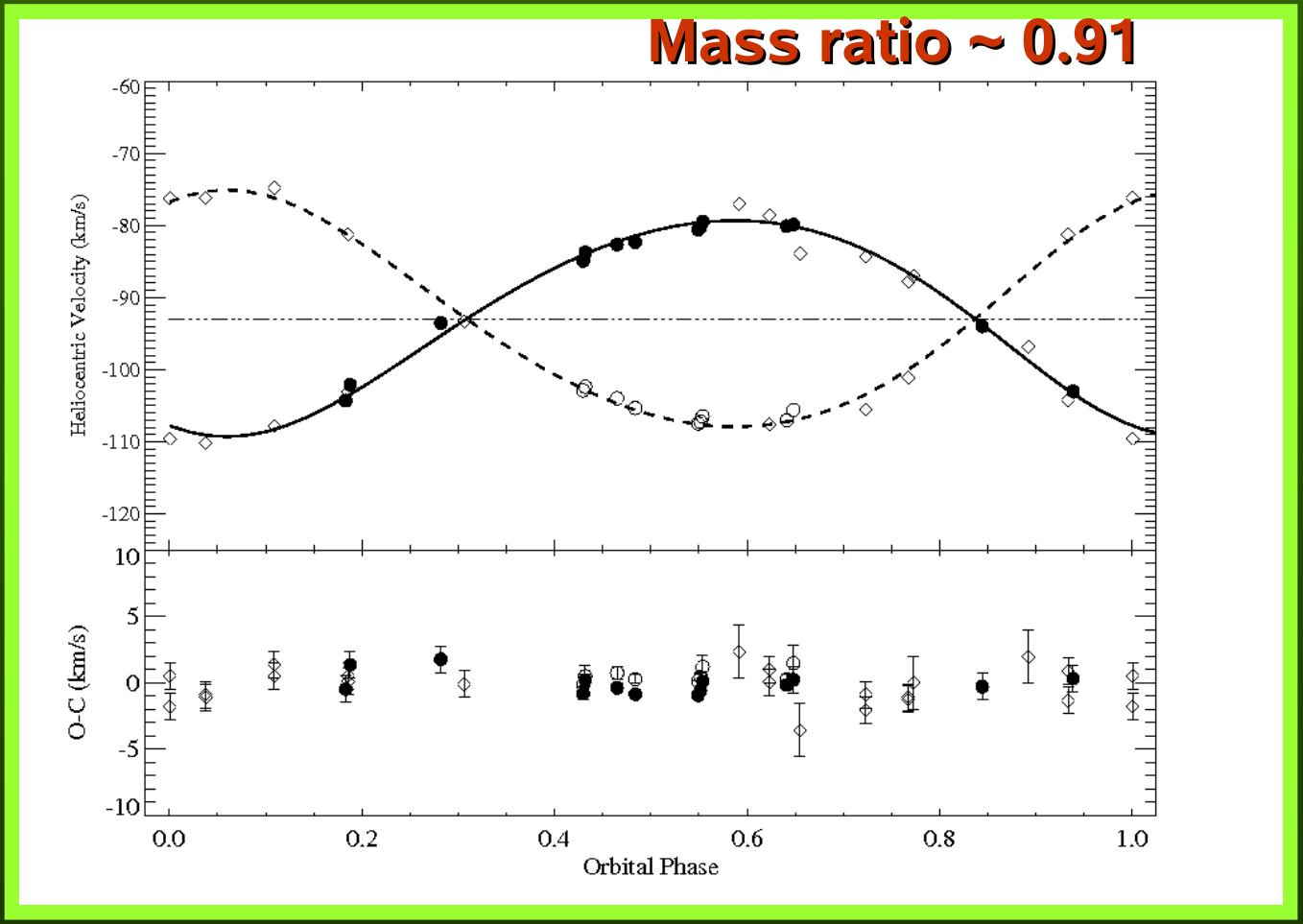
Chemical Analysis

- UVES/VLT spectrum shows a [Fe/H]~-3.6



González Hernández et al. (2007, A&A, in preparation)

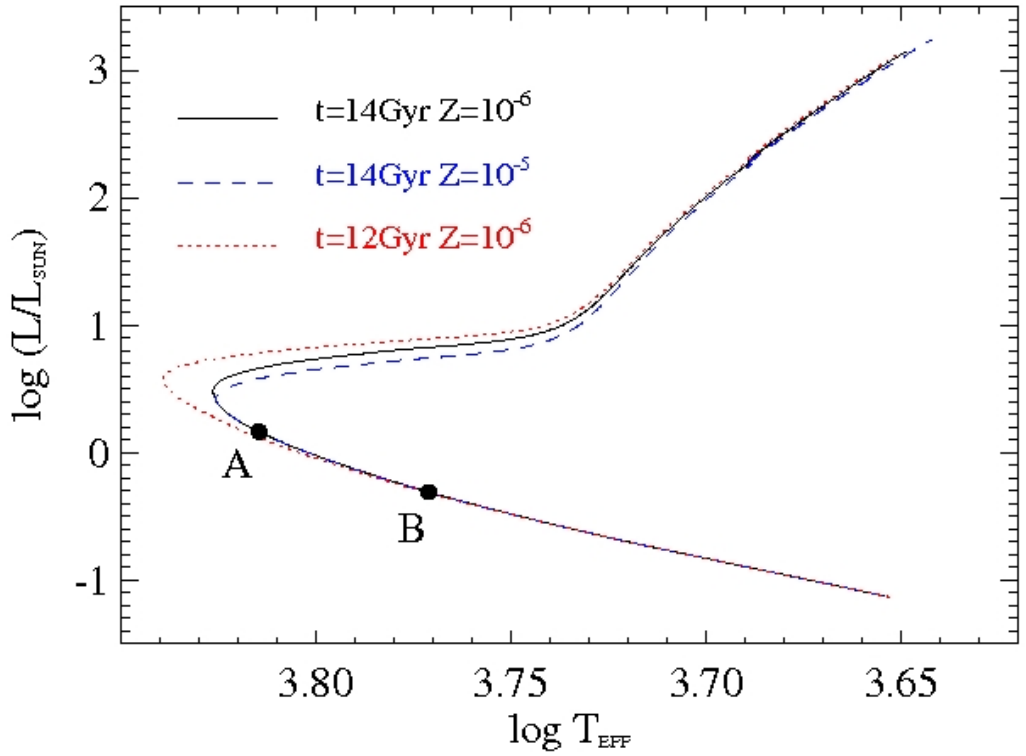
Orbital elements



New UVES/VLT data + Norris, Beers & Ryan (2000, ApJ)

Stellar Parameters

- Chieffi & Limongi isochrones (private communication)

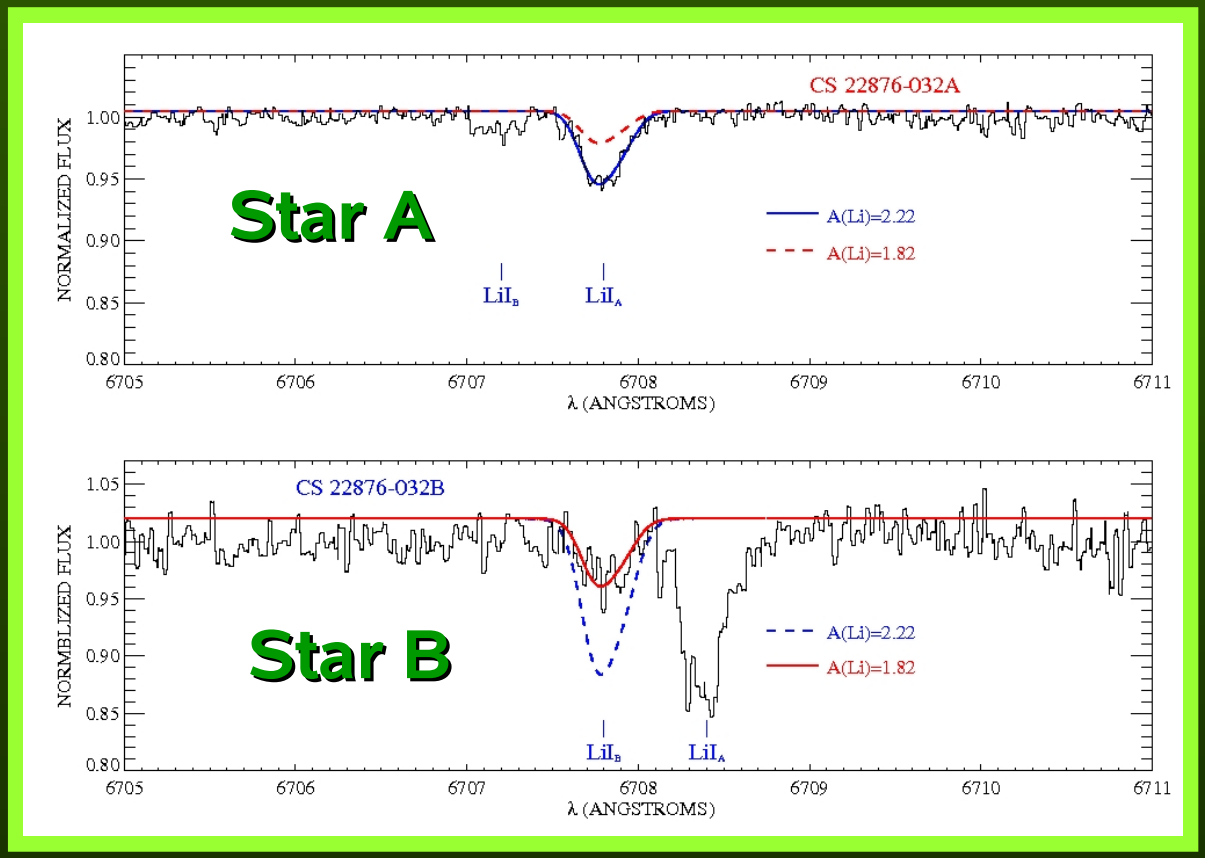


Teff ~ 6500 K for the primary

Teff ~ 5900 K for the secondary

Lithium: 1D abundances

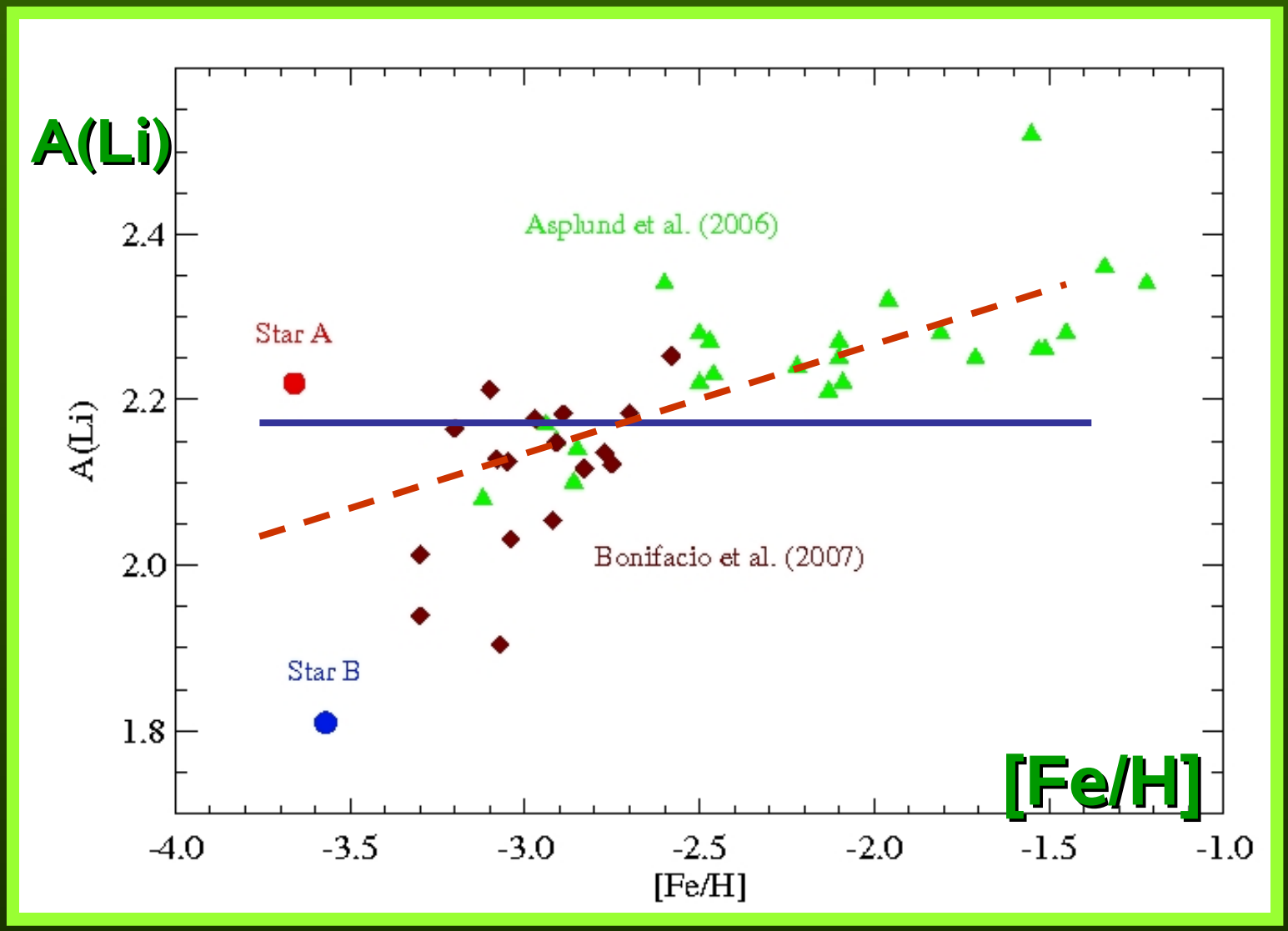
- Spectral synthesis of Lithium from LiI 6708 doublet: 1D analysis



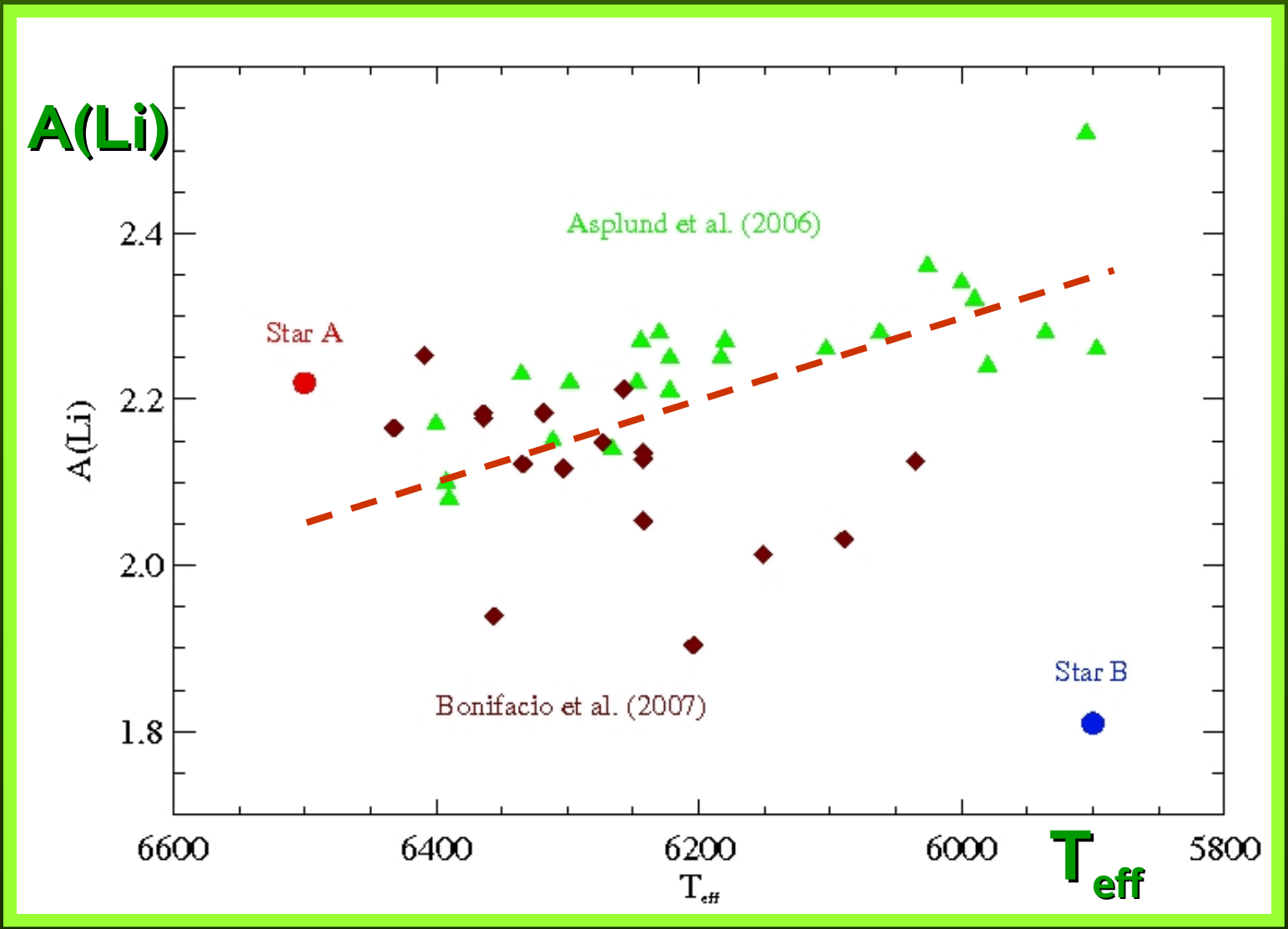
A(Li)~ 2.2 for the primary

A(Li)~ 1.8 for the secondary

Abundance trends: Lithium

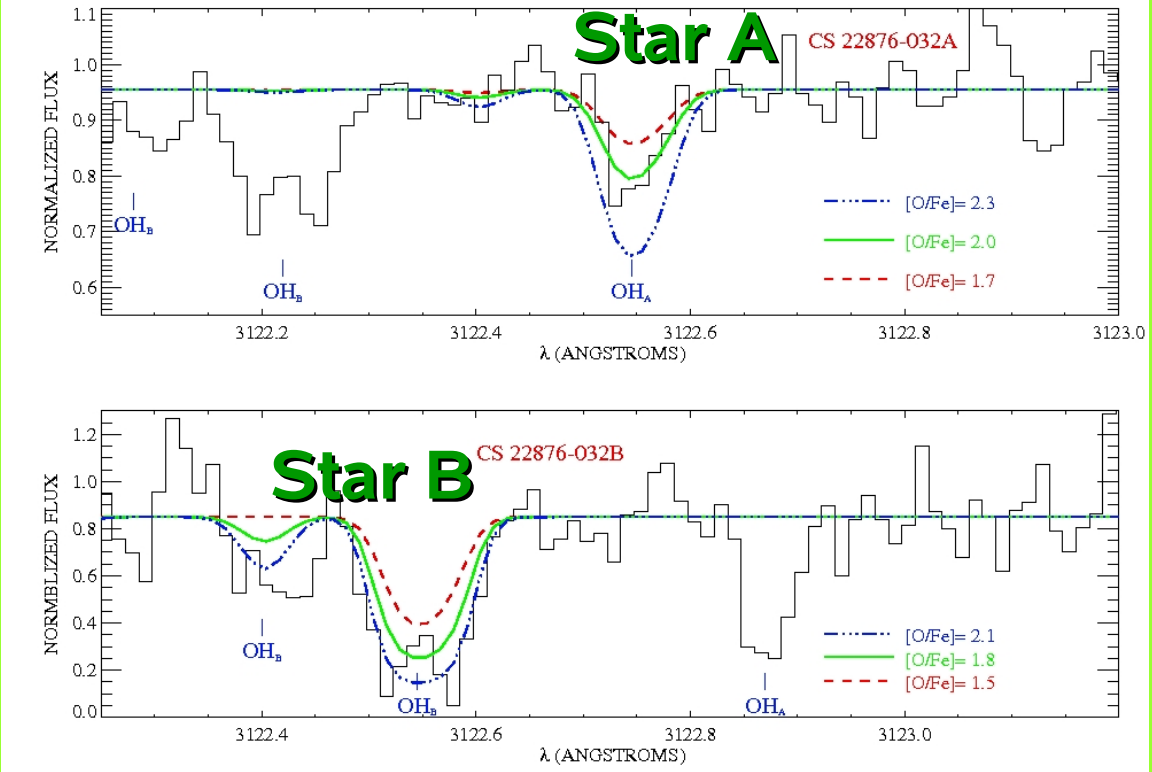


Abundance trends: Lithium



Oxygen: 1D abundances

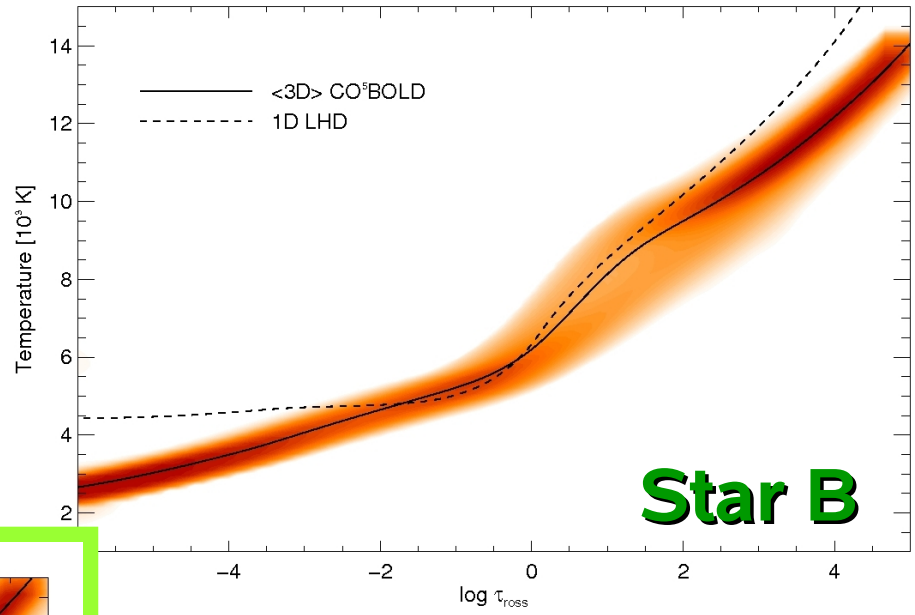
- Spectral synthesis of Oxygen for near-UV OH lines: 1D analysis

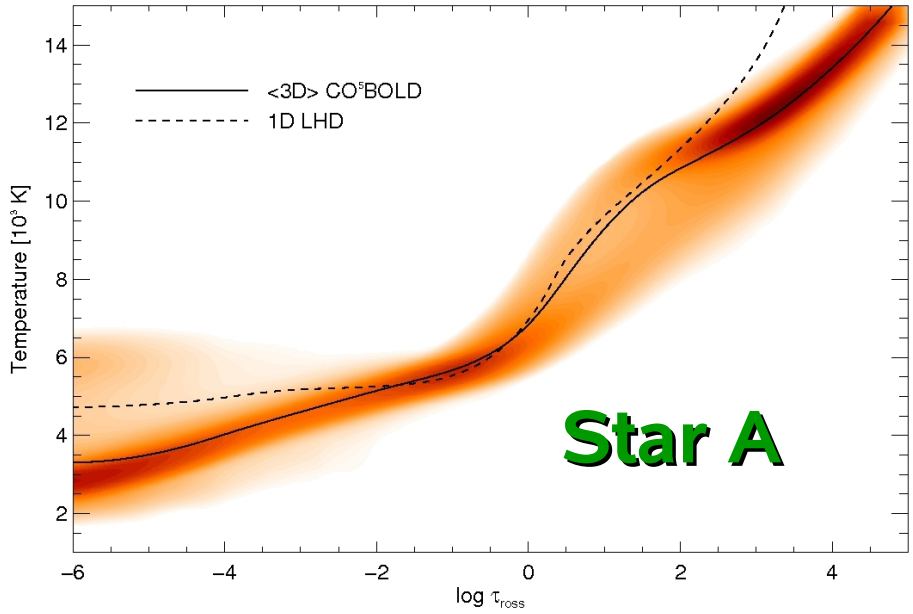


[O/Fe]~2 dex in both stars using 1D models

Model Atmospheres: 3D (CO5BOLD)

- 3D vs. 1D models



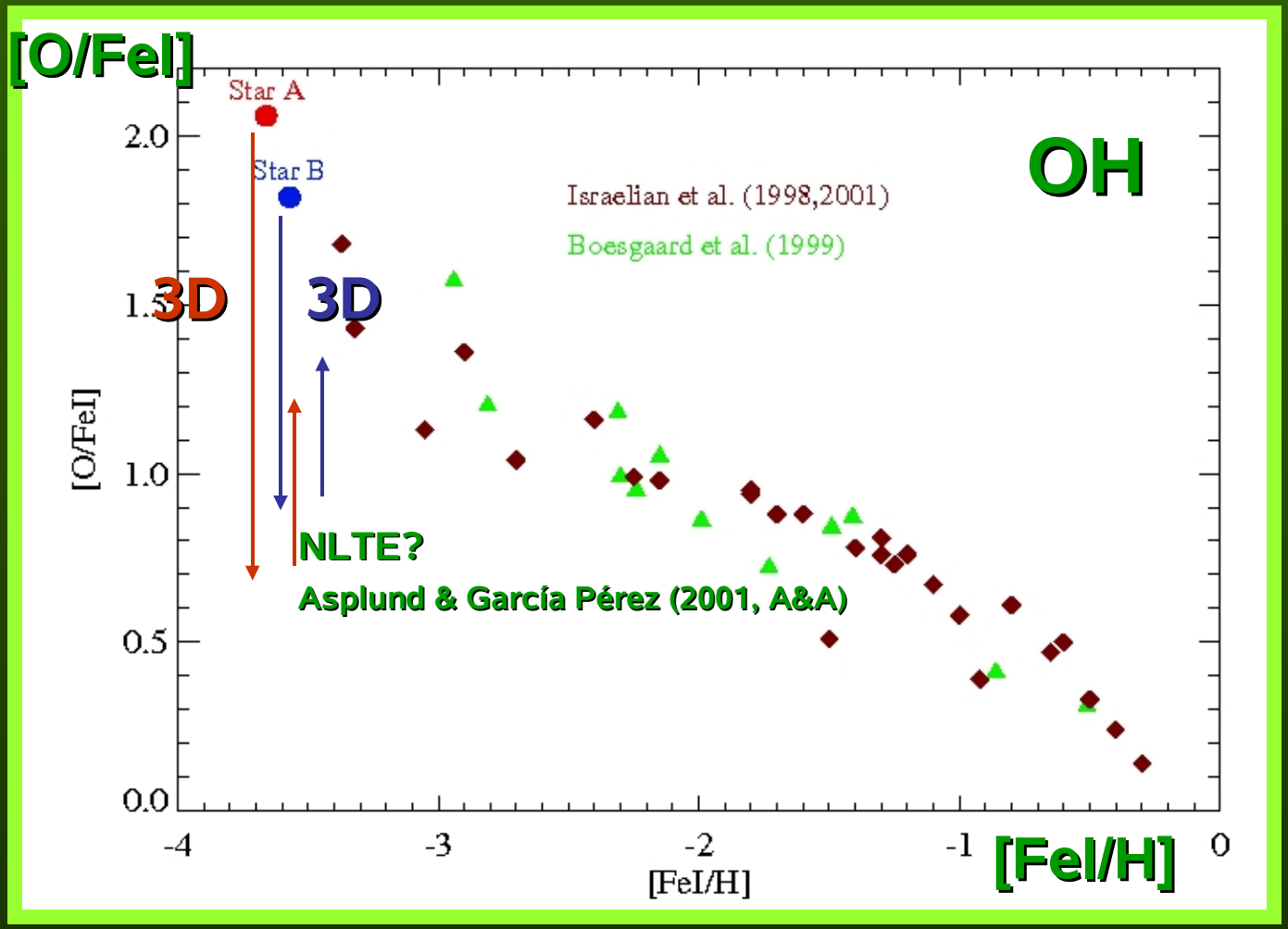


See poster of N. Behara for more implications of the use of 3D models on the Halpha profiles and Teff determinations

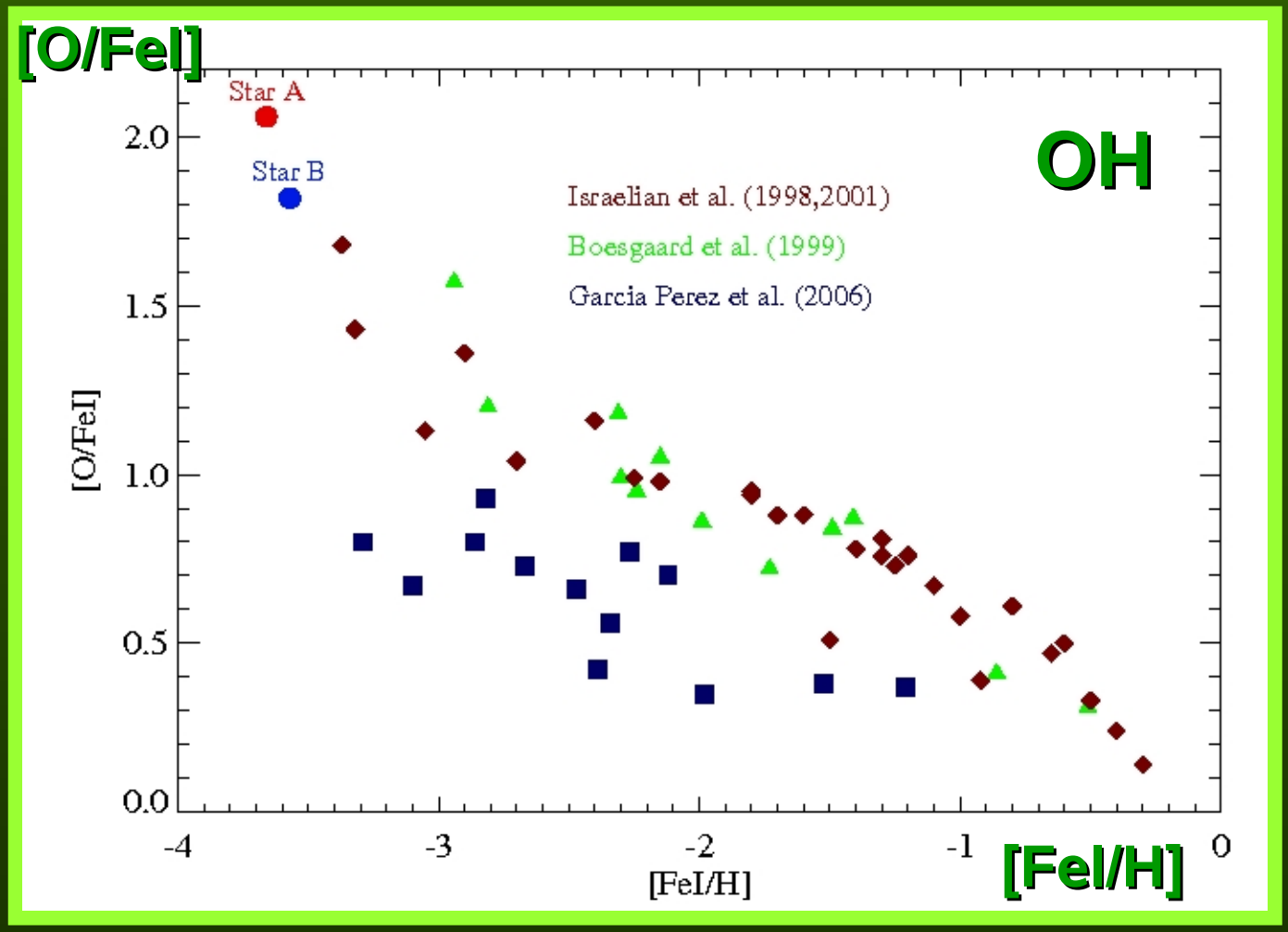
Oxygen: 3D corrections

Component	$[O/Fe]_{1D}$	$D_{3D-<3D>}$	D_{3D-1D}
Star A	2.06	-0.68	-1.46
Star B	1.82	-0.00	-0.94

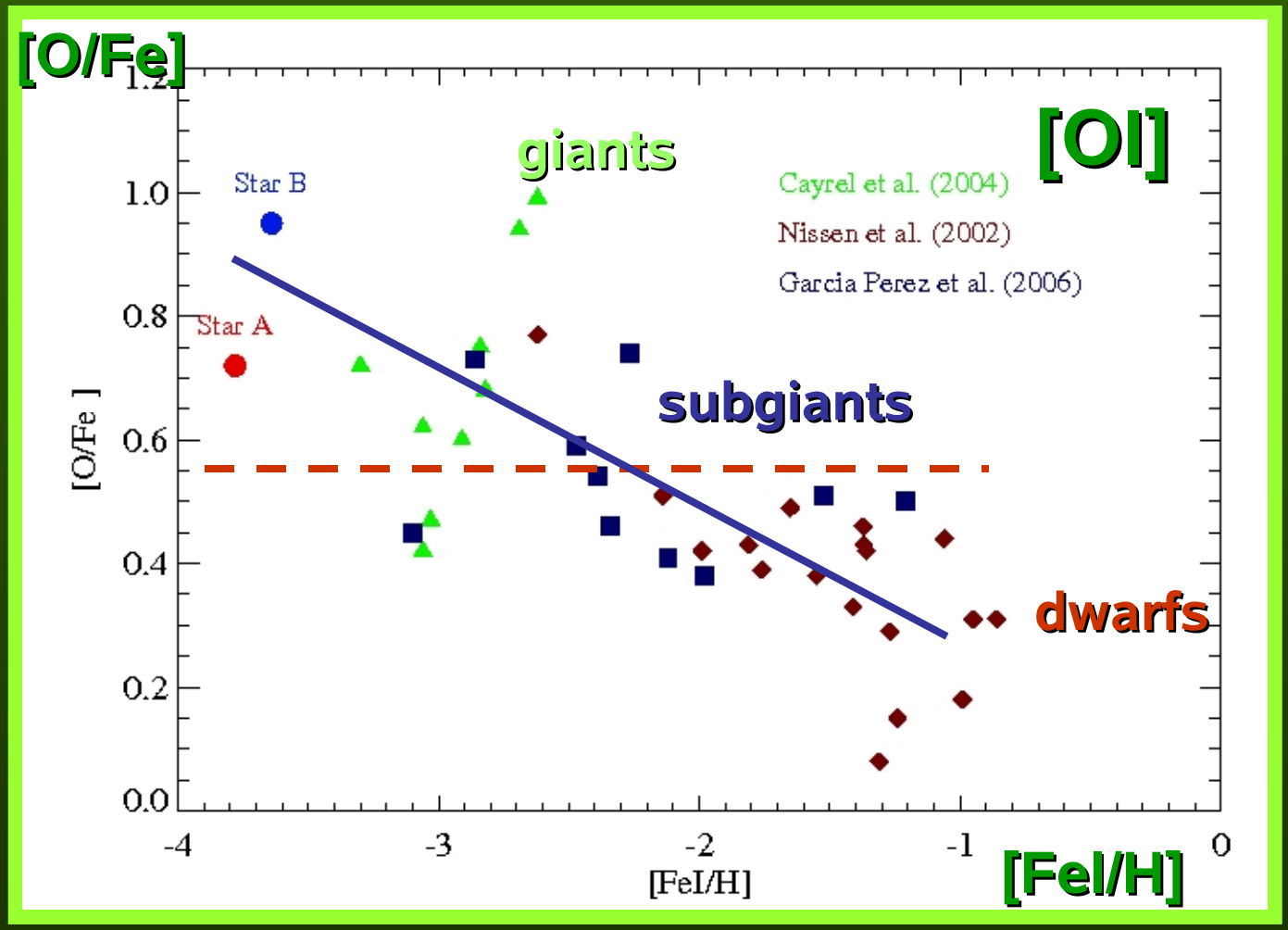
Abundance trends: Oxygen 1D



Abundance trends: Oxygen 1D



Abundance trends: Oxygen 3D



Conclusions and Future work

- 1D Li abundances suggest an increased scatter at the lowest metallicities with no clear slope of A(Li) vs. [Fe/H]

- The abundance trend of Oxygen vs. [Fe/H] seems to show a quasi-linear increase towards lower metallicities

- However, this might be considered with caution until 3D corrections and NLTE effects are applied to O and Fe for different abundance indicators in metal-poor dwarfs, subgiants and giants