

Some summary words

(an overview, not a review, no conclusions)

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The Lithium problem
“A beautiful mess”

What do we see

What would we expect to see

Is there a problem?

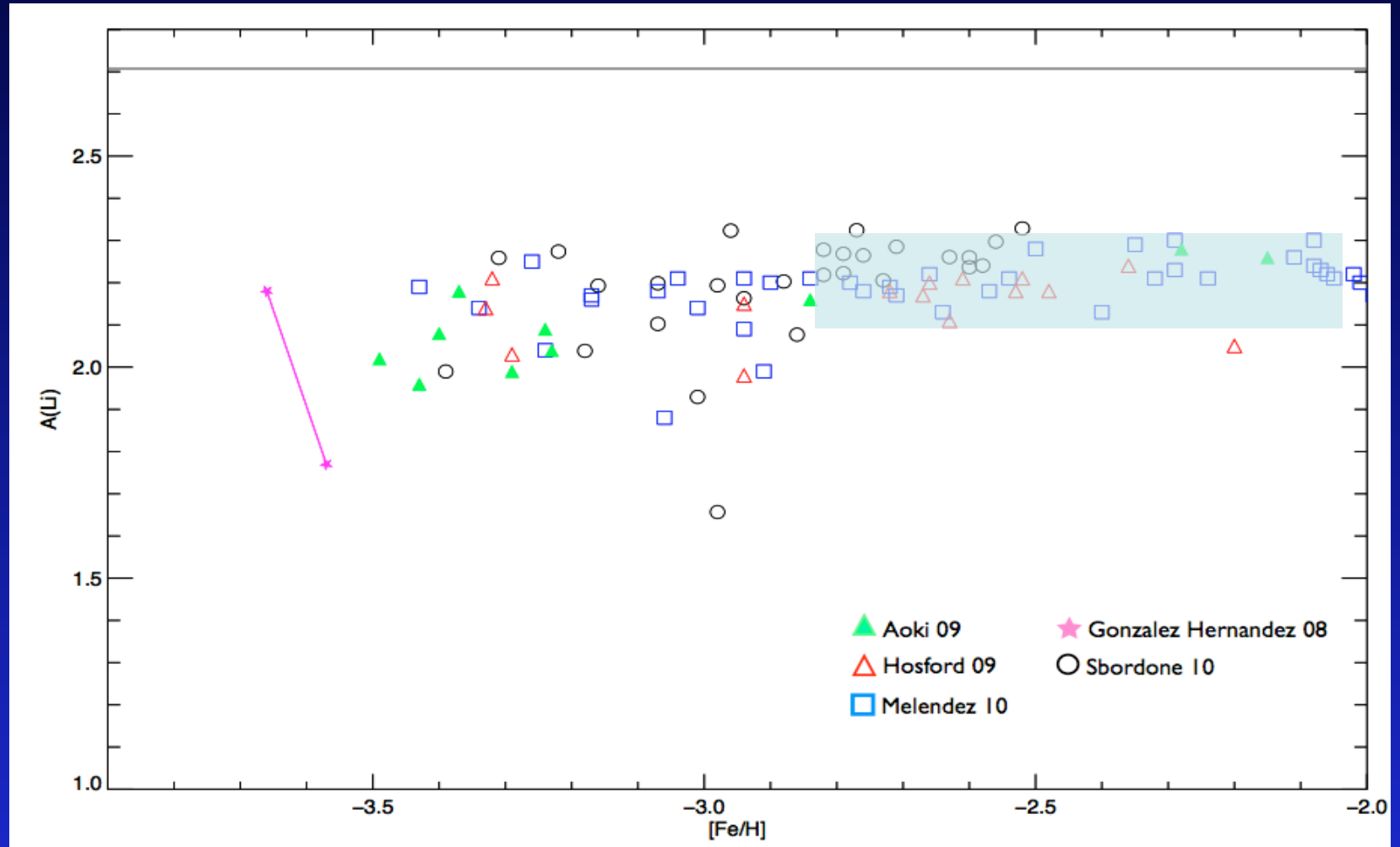
Think it over, is there a problem?

Alright then

“ To Li or not to Li. What is the problem? ”

Observations of ${}^7\text{Li}$

Turn-off
halo stars



Shall we be concerned with this?

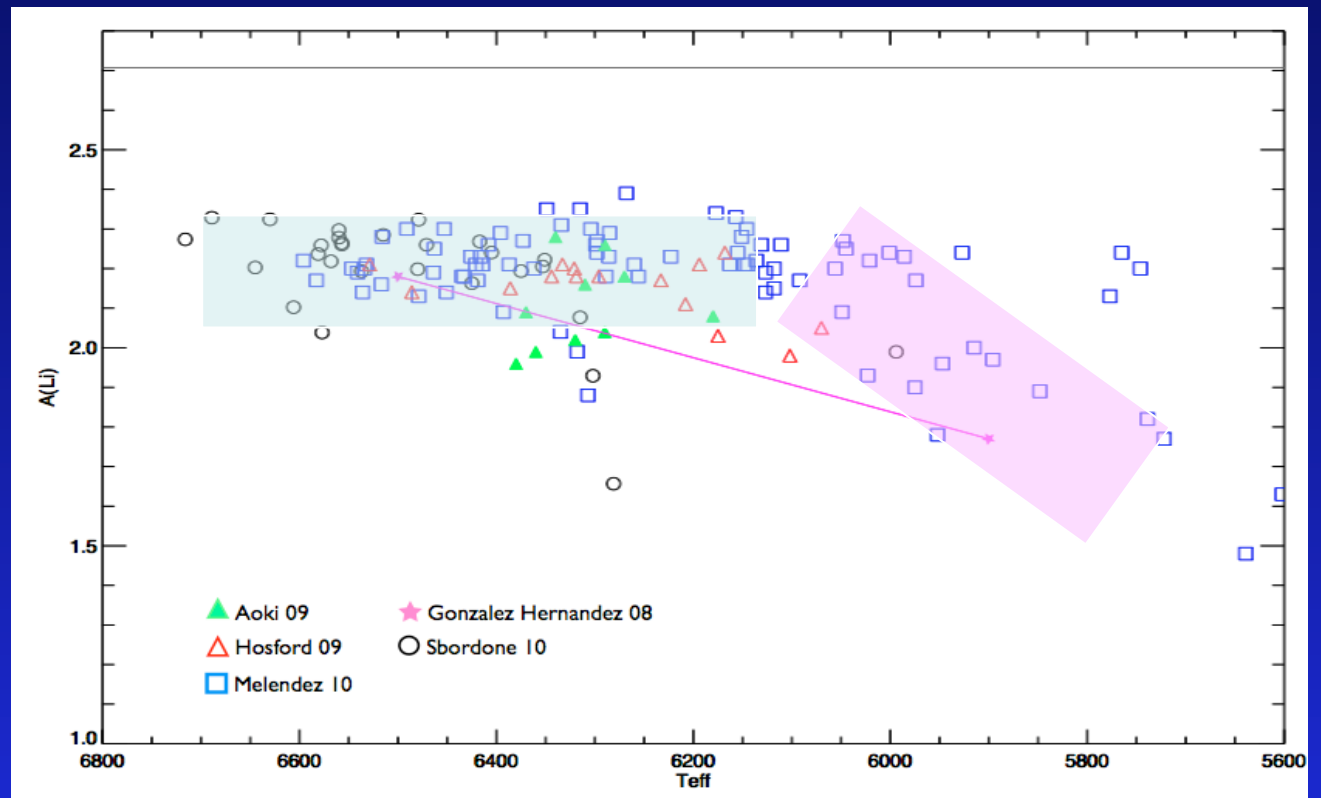
[Sbordone]

Observations, let's rephrase the question:

Are we to be concerned by stars exhibiting an *almost constant* abundance of Li7, in a given range of (low) metallicities?

We are if they are very different objects, coming from different environments

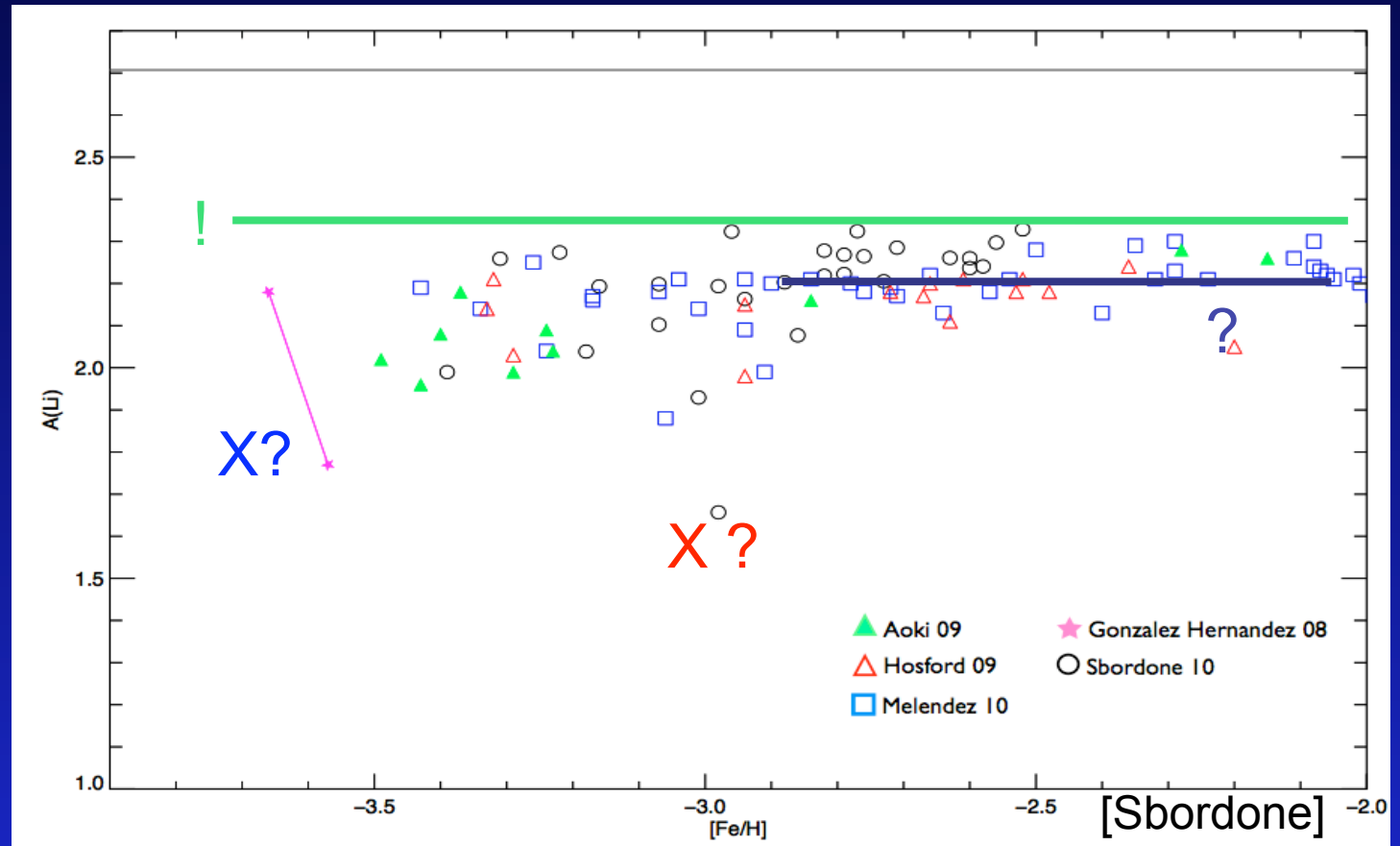
And if a (the) value exists and is unique!!



[Sbordone]

Observations, let's play a game

Can anybody identify a special value in this plot?



Plateau in this case is the “roof” plateau,
an upper limit, an “envelope”

Observations

“The plateau is universal in terms of *loci*”:

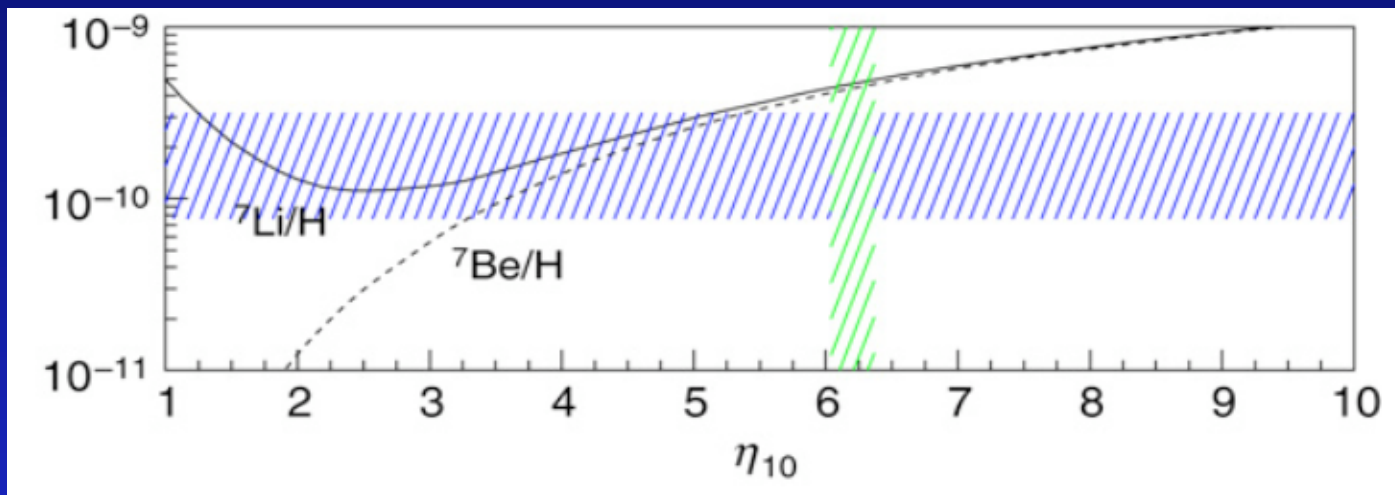
- Halo field stars
- Galactic bulge (1 star?)
- Globular clusters

[P. Bonifacio, yesterday]
and no following uproar

Ok, so we can compare things

Roof value/envelope, with whatever we do expect it to be compared with

Primordial value?



${}^7\text{Li}$ depends on η_{10} (or ω_b) but this is NOT anymore a parameter to be retrieved by other BBN observables (i.e. Deuterium) CMB is there to help us. And it does.

Standard BBN seems to work

“I am the only one without a problem”

[E. Skillman]

“No sensible modification of primordial ${}^7\text{Li}$ through standard BBN processes”

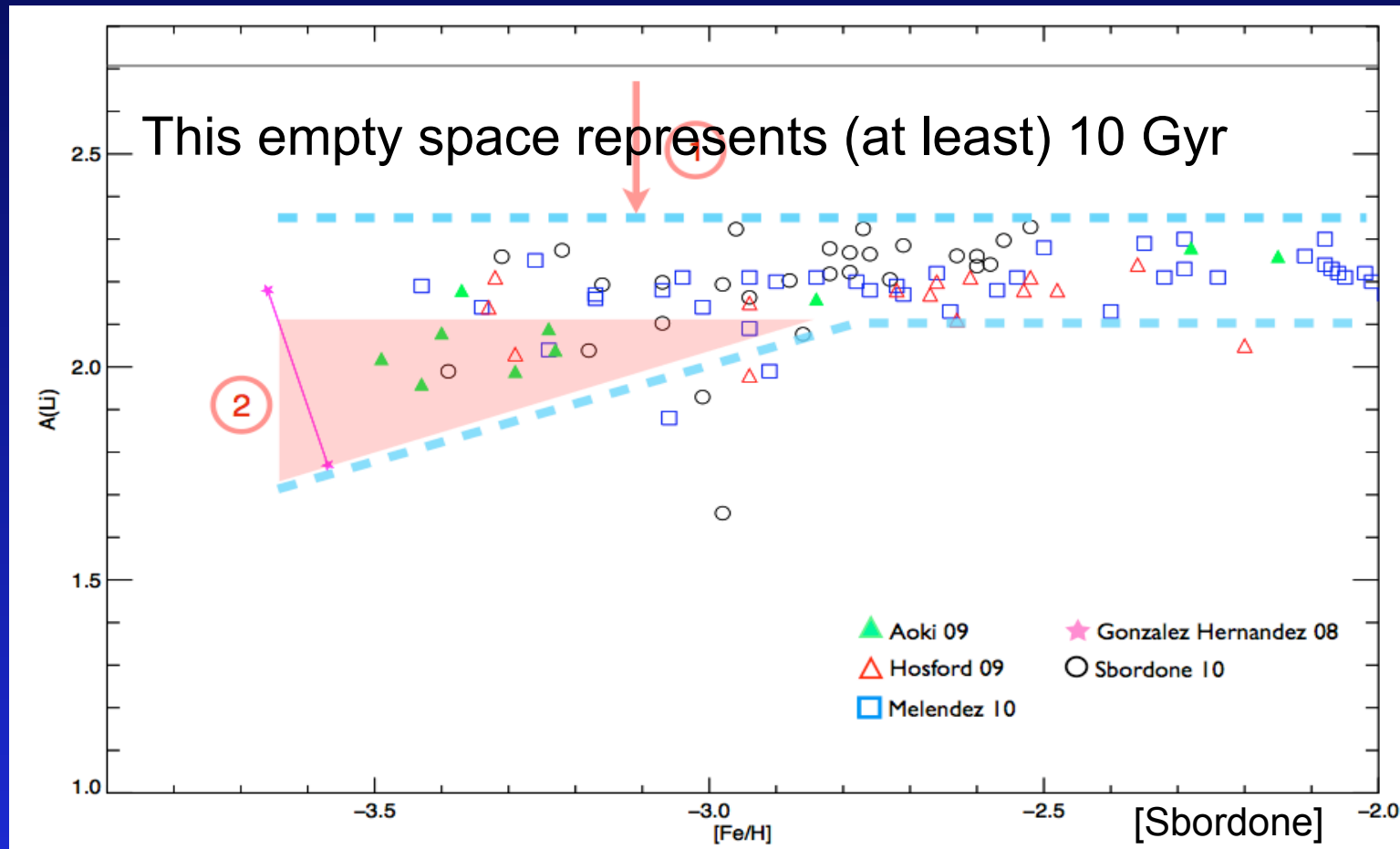
[A. Coc]

“Need almost unphysical processes to produce the resonances to destroy the ${}^7\text{Be}$ (i.e. ${}^7\text{Li}$)”

[F. Villante]

Alright, there is a mismatch

But don't blame it on the temperature scale of observations



(you can call it a “problem” if you want)

Globular Clusters

Italian wisdom:

“Globular Clusters are the perfect environment to study this kind of things: you have homogenous stellar population(s) and whatsonot...

and then, all of this hell of a pollution with chemistry.

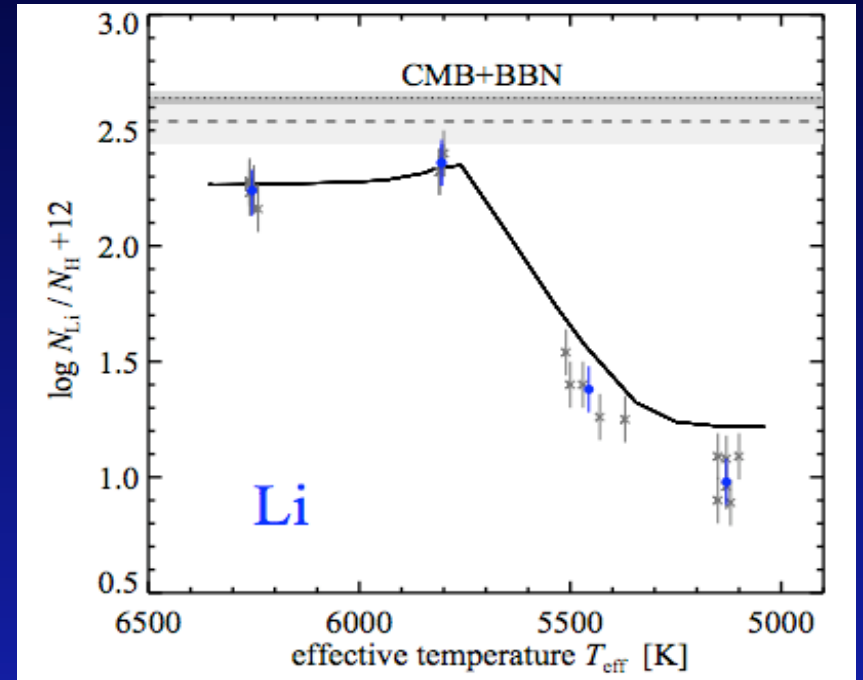
It seems like good God put them there just to *mock* us.”

[you can speak up your name if you want to]

Observations, globular clusters:

“[...] it is clear that diffusion, turbulence and intracluster pollution can bridge the gap ”

[A. Korn, yesterday]
and no following popular uproar



Recipe: “Start it up, Stir it up, Wait for 11 Gyr”

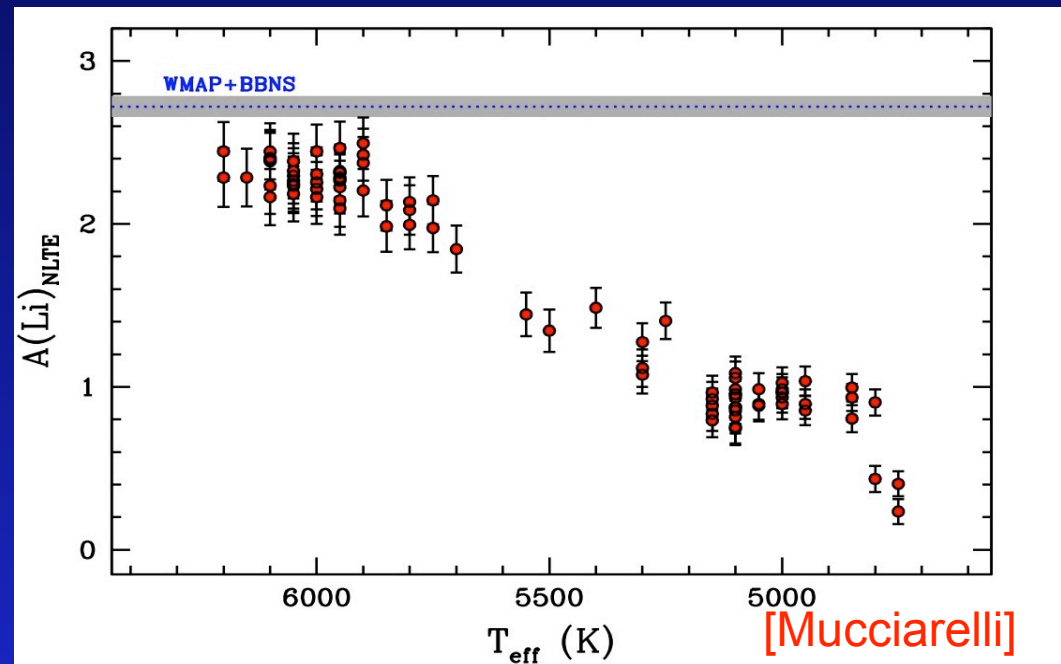
Yes it is true: we do not know the details of these processes
But this is not a good reason to disregard it “tout court”

We can test it, and learn...

Tuning parameters “in situ”

T-off plateau vs I-RGB plateau

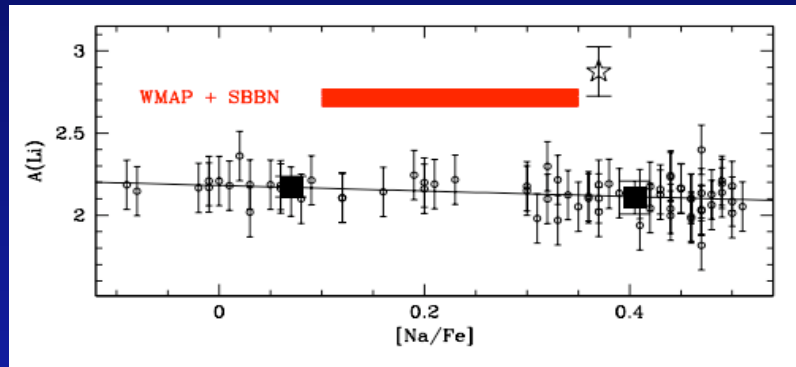
This is a “efficient” way,
phenomenological approach



Or (/and!) testing our models on different stars
theoretically more satisfactory, and generalizable

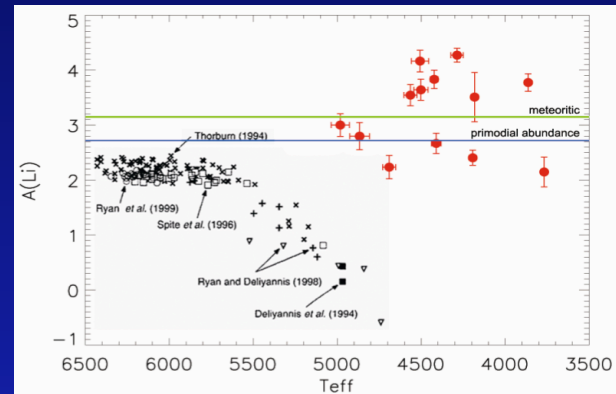
Other monsters are hiding in different environments...

One very Li-rich turn-off



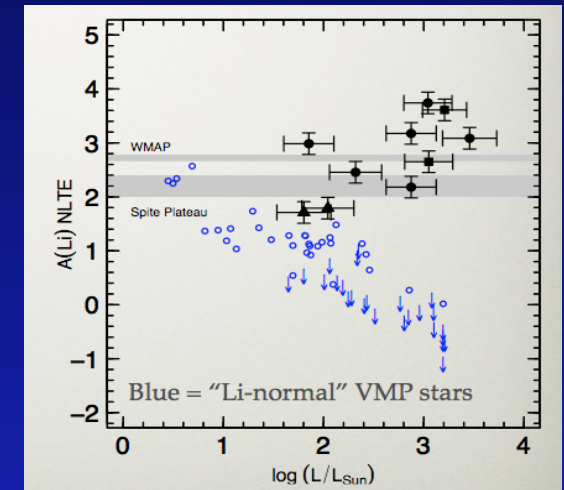
[Monaco]

0.44 % of Red Giants



[Fu]

Metal-poor stars in RAVE

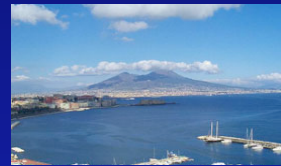


[Ruchti]

But this may be *another* problem, or *other* problems

In situ production/destruction

Try and reconstruct the initial composition of the Earth's atmosphere next to a car with a running carburettor



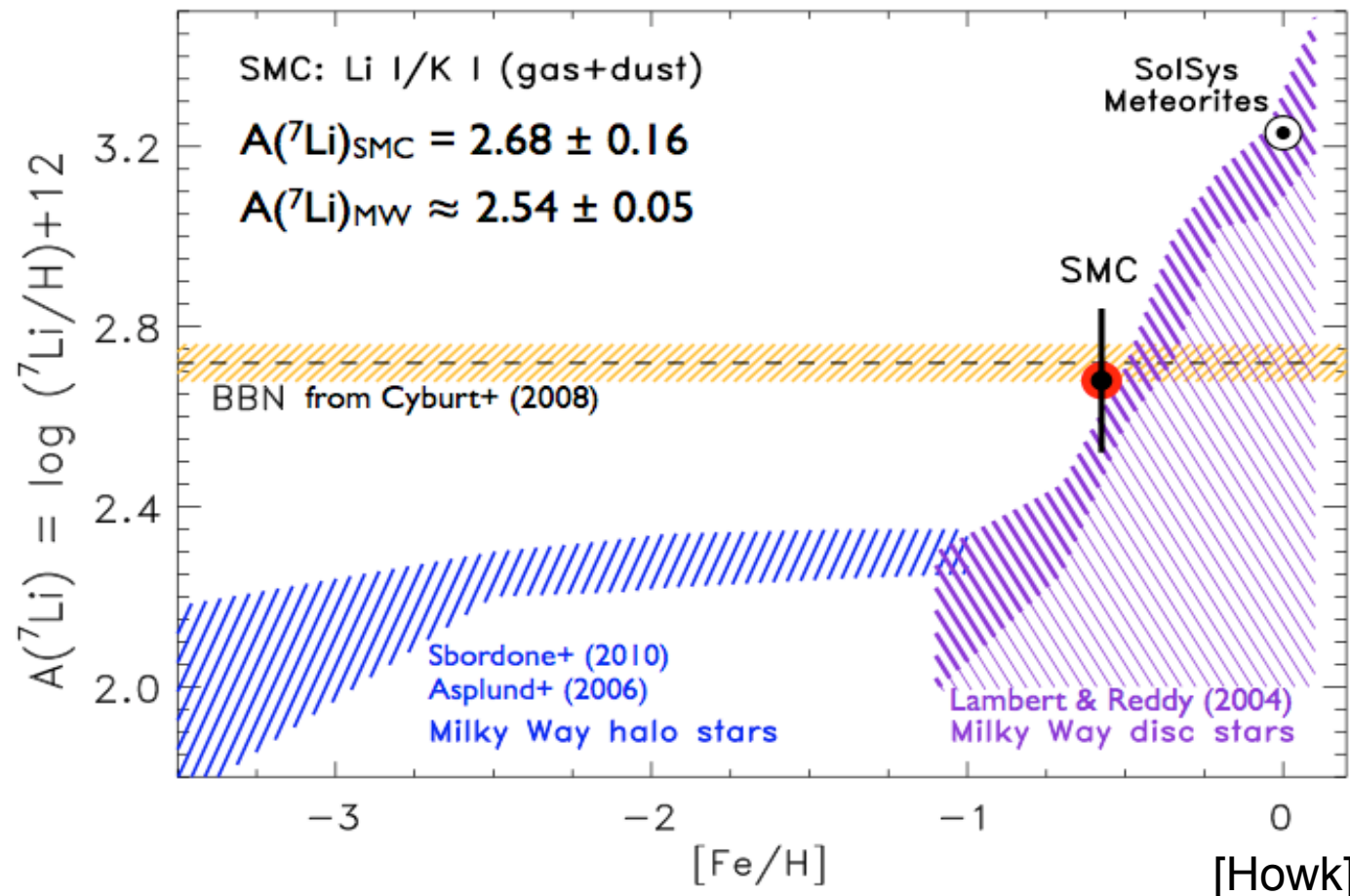
It is a beautiful thing, and can give you a lot of emotions and surprises. But is it representative of the environment?

[P. Serpico, talking about...]

Observations in the “atmosphere”



The Small Magellanic Cloud as probe of pre-galactic Li



Alright: one case

We want more!

So, what's the problem?

cosmological : “related to the study and nature of the universe”

primordial : “existing at or since the beginning of the universe”

[Cambridge Dictionary Online]

Do we have to reconcile Li observations with BBN?

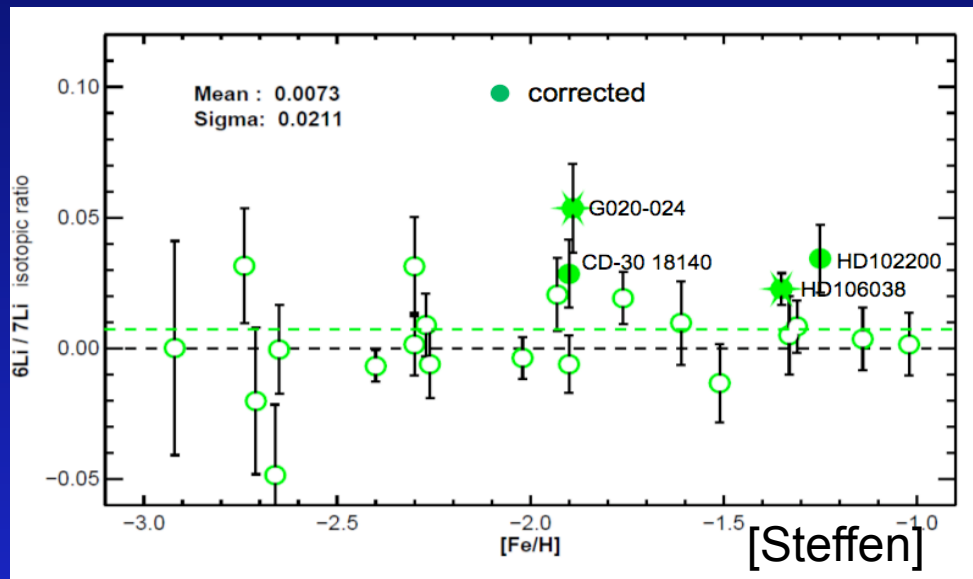
Yes: *“you can”*

See the talks before this one

And what about ${}^6\text{Li}$?

“It is very unfortunate that we started talking about the ${}^6\text{Li}$ plateau in the first place”

[A. Korn, yesterday]
and no following uproar



Swedish wisdom:
“Has ${}^6\text{Li}$ been detected? Maybe”

[K. Lind]

But this is very likely another story...

30 years of problems (but in no solitude)



As all good problems, it mutates

Concluding (?)

“You have a problem, and the problem is that your problem is not the problem you think you have.”

[My therapist]

“ - It looks like grandma’s mood is so much better today!
- ’course son: Lithium never fails. ”

[My dad]