Lithium Abundances for 1000 Evolved Stars

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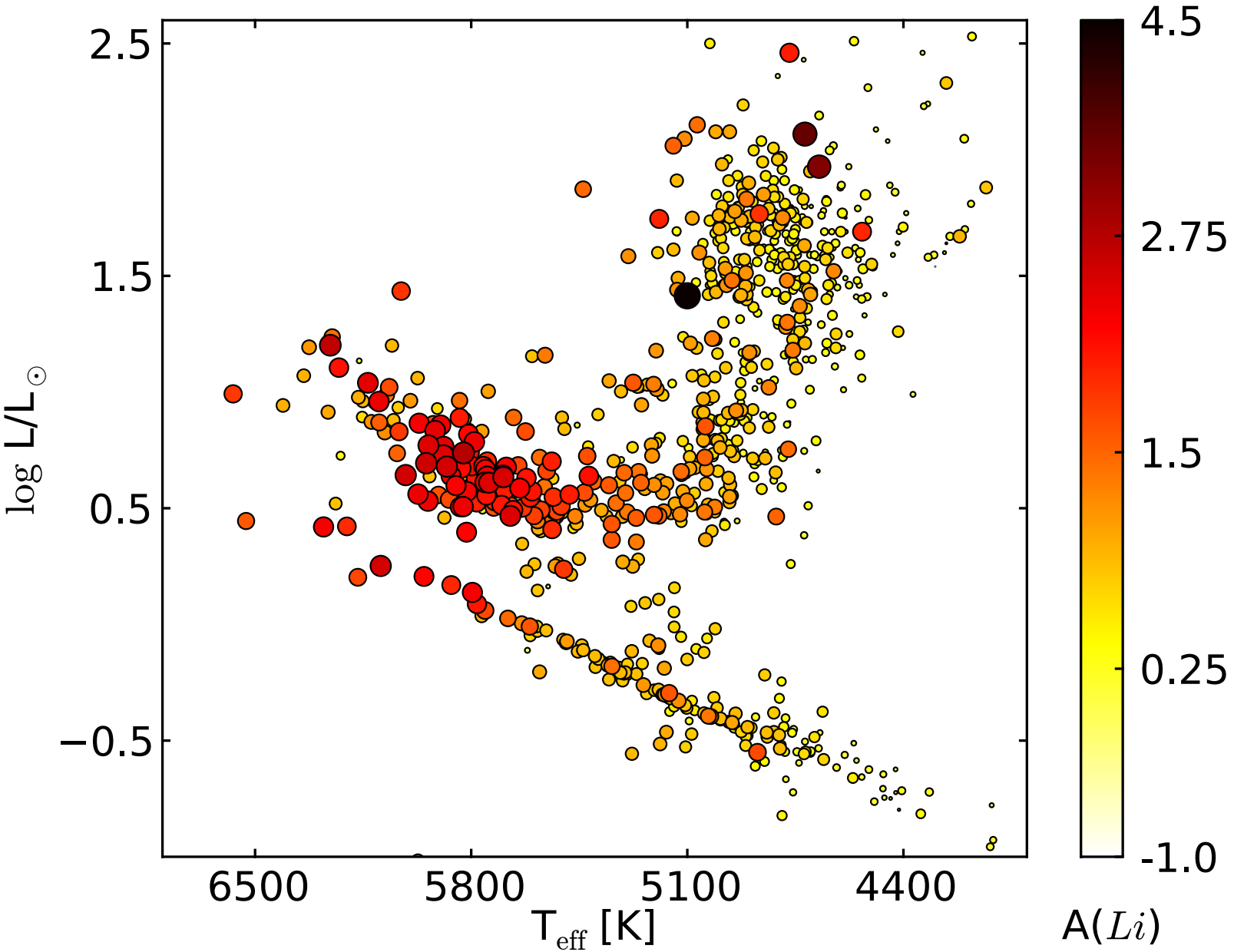
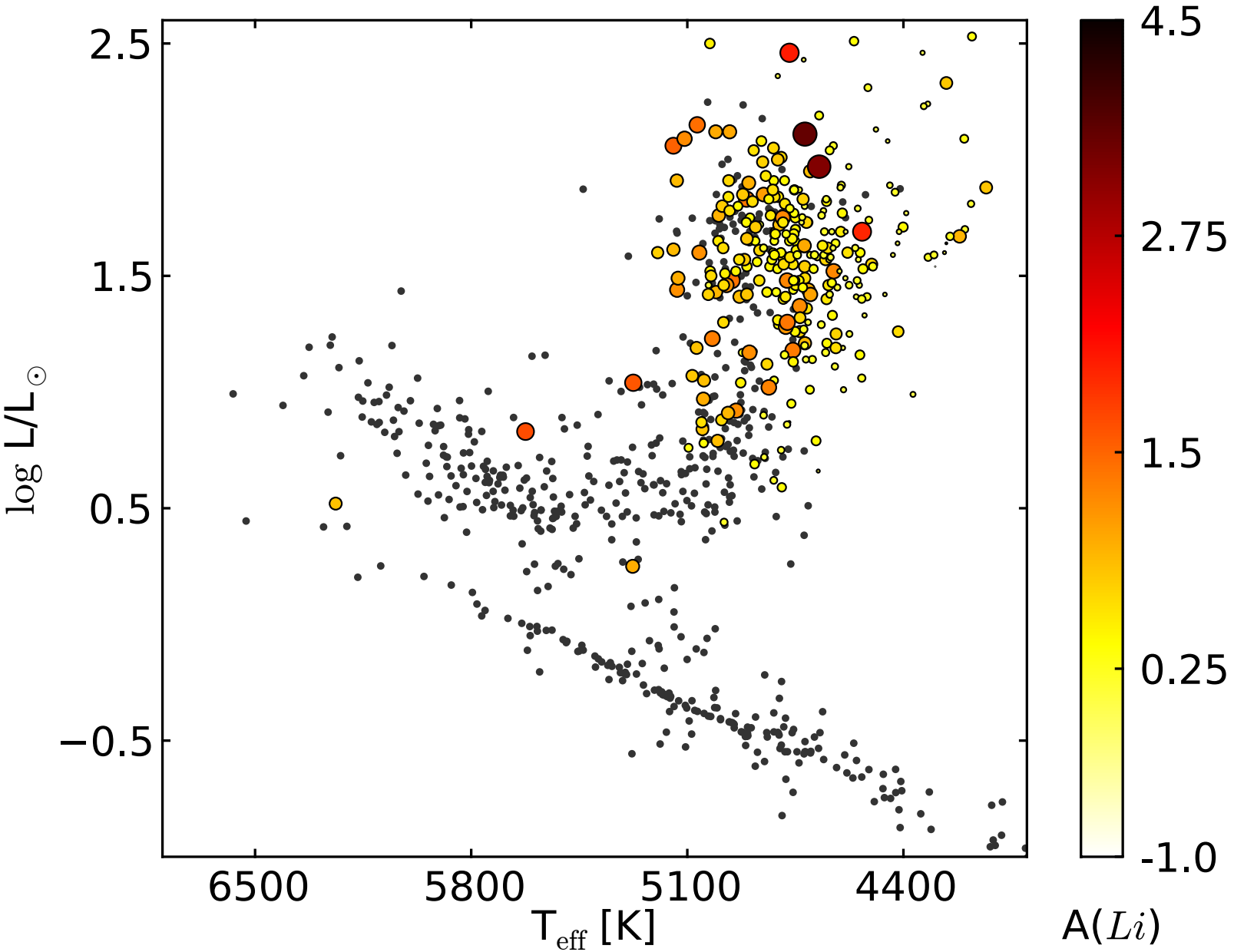
Observations and data reduction

- Pennsylvania - Toruń Planet Search (PTPS)– a search for planets around evolved, intermediate mass stars
- 9.2m Hobby – Eberly Telescope + High Resolution Spectrograph R=60 000, SNR$\sim$ 200
- The spectra consist of 46 echelle orders on the ”blue” CCD chip (407-592nm) and 24 orders on the ”red” one (602–784nm)
- Most of 1036 monitored stars has multi-epoch RV data.
- All data were carefully reduced due to random HET/HRS flat field contamination with emission feature near $670,8$ nm
- Spectroscopy Made Easy package $\rightarrow$ Li abundance determination

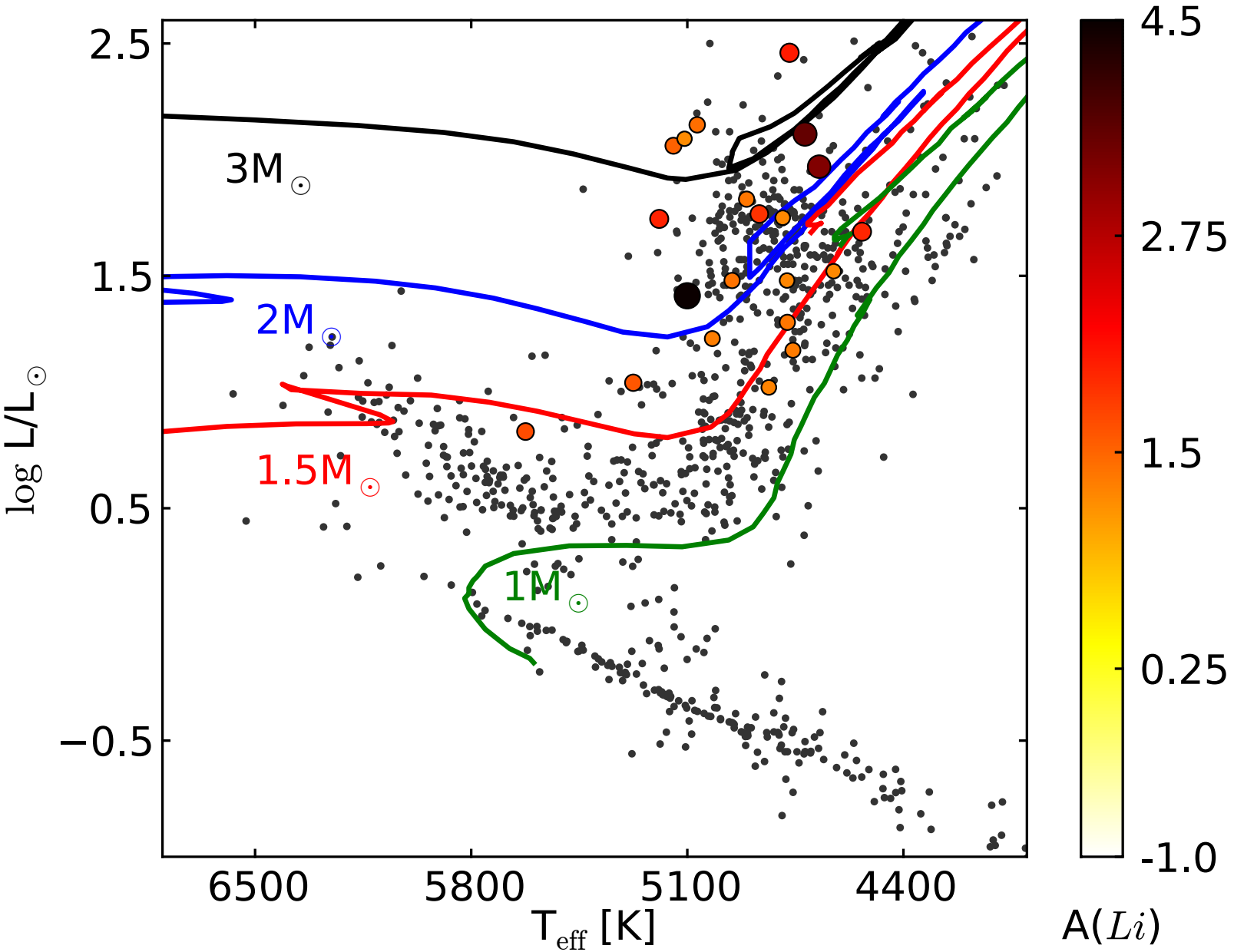
Lithium Abundances



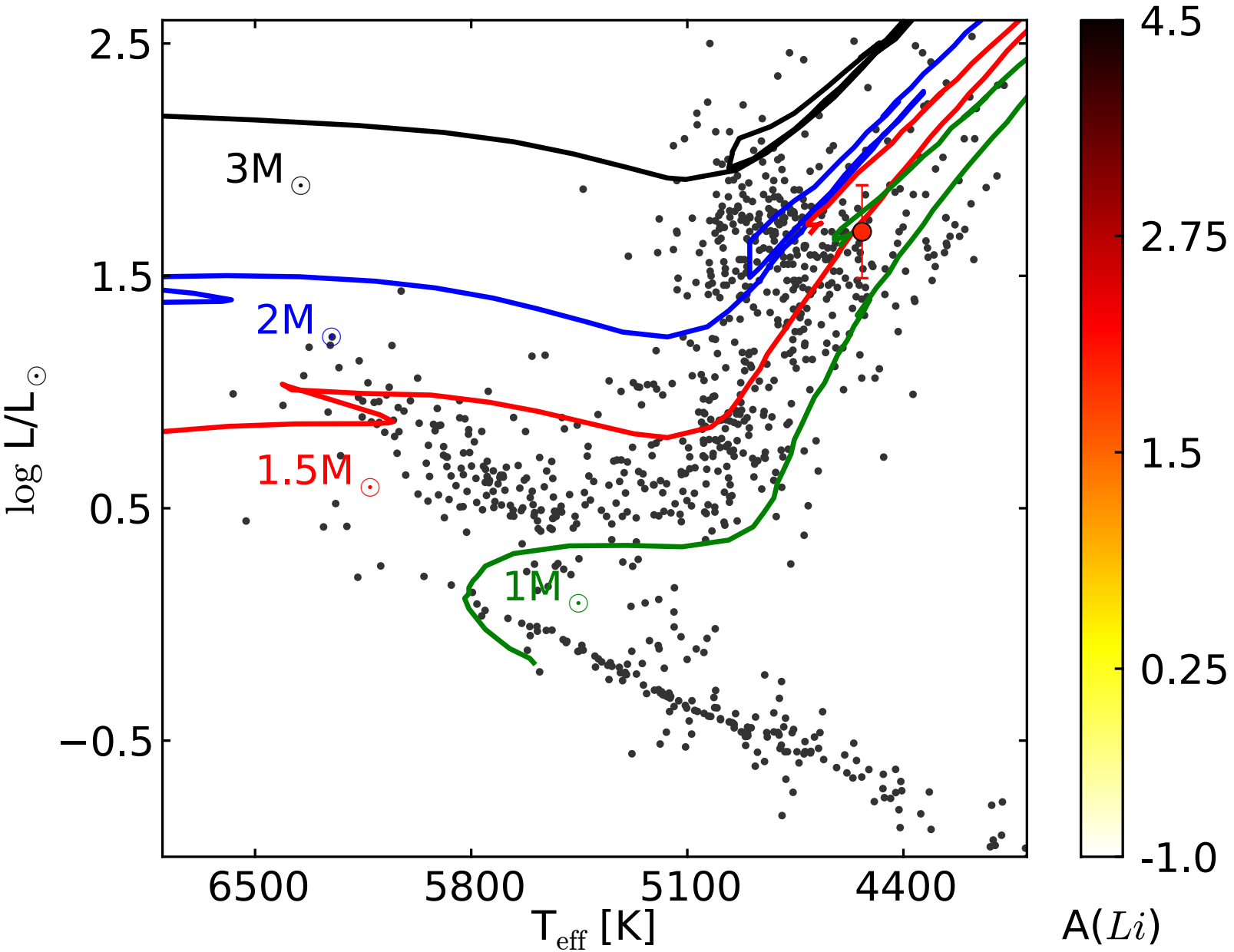
Lithium Abundances



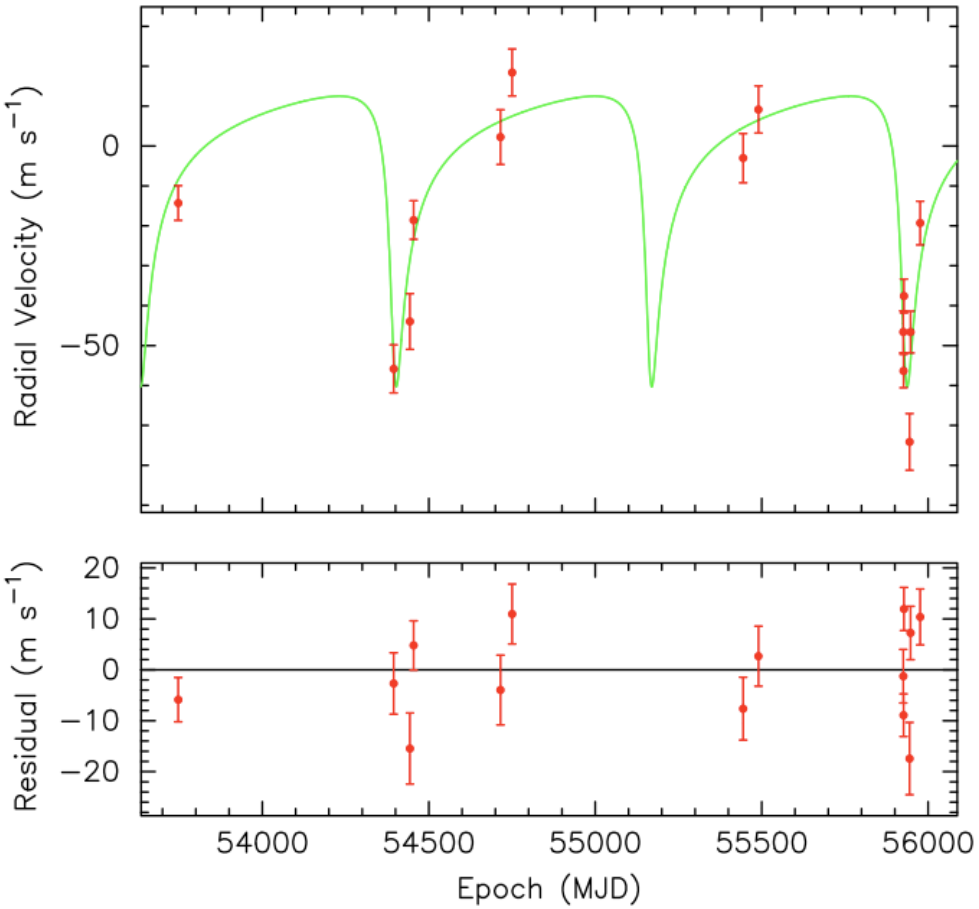
Li rich stars near RGC



Li-rich giant: T_{eff}=4534, Fe/H=0.13, log g=2.24



RV observations of the star and planet's orbital parameters



Parameters	
P [days]	767.5± 2.4
T_0	54396.2± 36.4
e	0.74 ± 0.11
K [m s^{-1}]	36.4 ± 9.1
Ω	152.7± 24.2
$m_2 \sin(i)[M_{Jup}]$	1.7
a [AU]	1.91
χ^2	4.68
σ_{RV} [m s^{-1}]	9.5

Li-rich giants

PTPS	$T_{eff}[K]$	$\log g$	$[Fe/H]$	$A(Li)_{LTE}$	$A(Li)_{NLTE*}$	$M[M_{\odot}]$
218	4719	2.38	-0.18	3.86	3.58	2.8
926	4673	2.45	-0.14	3.64	3.40	2.2
1254	4769	2.37	-0.25	2.41	2.46	1.9
1015	4534	2.48	-0.13	2.24	2.33	1.5
1509	*4867*	*2.72*	-	*2.23*	-	*2.24*
1413	*5100*	*2.98*	-	*4.59*	-	*1.66*

*Lind et al. 2009

Conlusions

- Here we present extensive A(Li) study for a large sample of stars at different evolutionary stages.
- For $\sim$30% of stars (RCG) wide set of parameters was determined (radial velocity, mass, age, radius, and basic atmospheric parameters).
- We report a discovery of Li-rich giant and speculate that its Li enhancement is connected with recent planet engulfment episode.
- Our sample also revealed:
  - 2 objects with A(Li)>3;
  - 2 where 2<A(Li)<3
  - and 13 where 1.5<A(Li)<2.

Thank you.