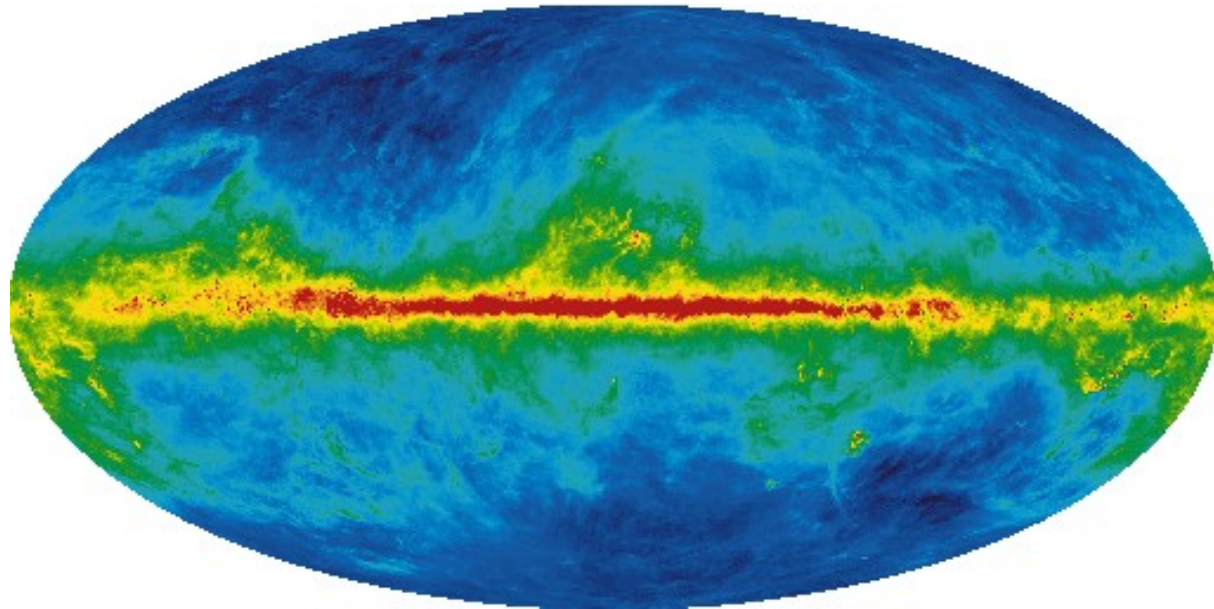




Gaia & le milieu interstellaire



Carine Babusiaux, Rosine Lallement

- **Spectrophotometry**

 - atmospheric parameters + extinction

$G < 20$

- **Spectroscopy**

 - Diffuse Interstellar Band at 8620 Å

$G_{RVS} < 14$

- **Astrometry**

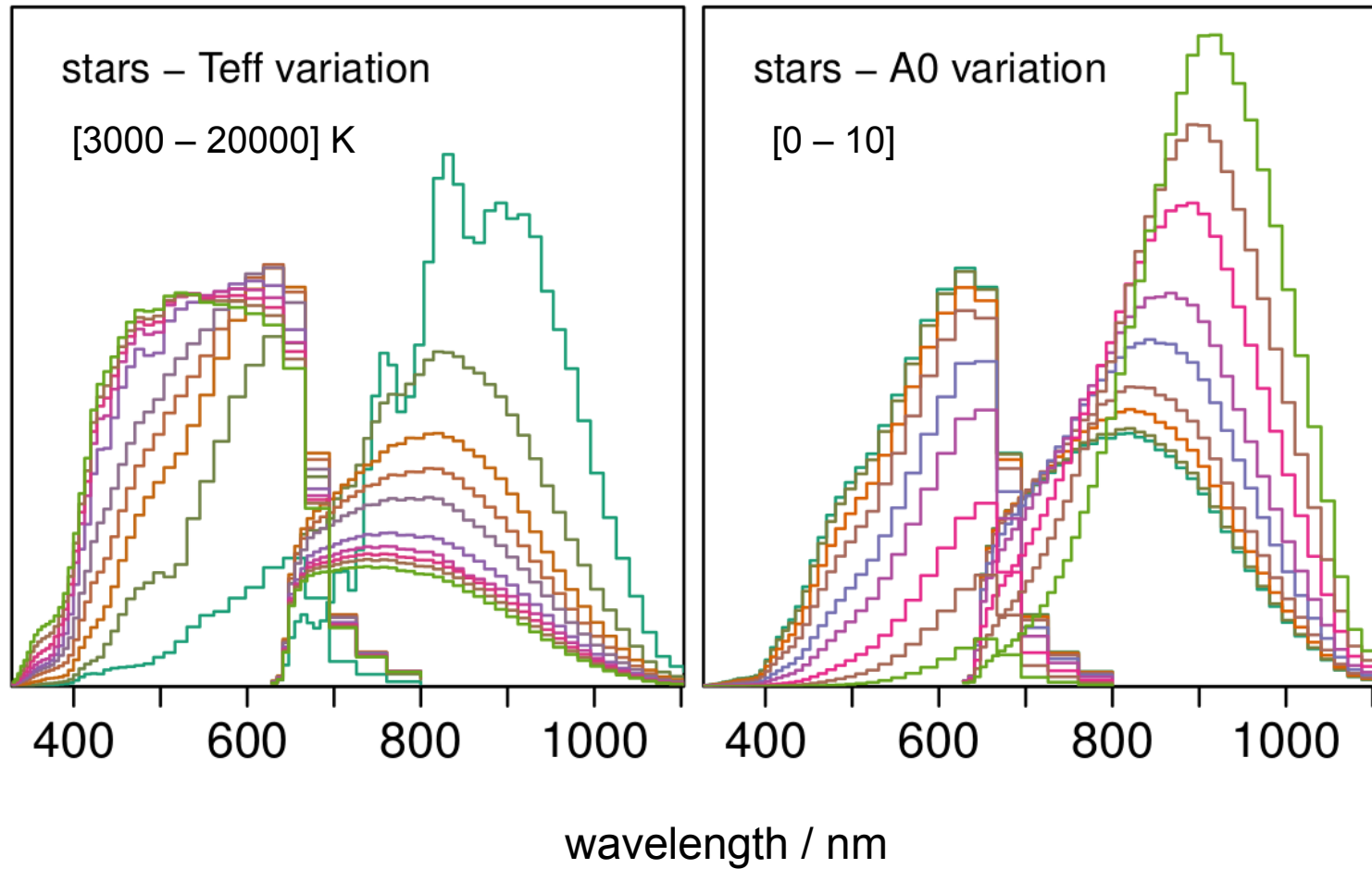
 - distances → 3D ISM map

- **Spectroscopic HR follow-up**

 - IS lines, DIBs : intensity & Vr

 - 4D ISM map and direct link with HI

Photometric performances

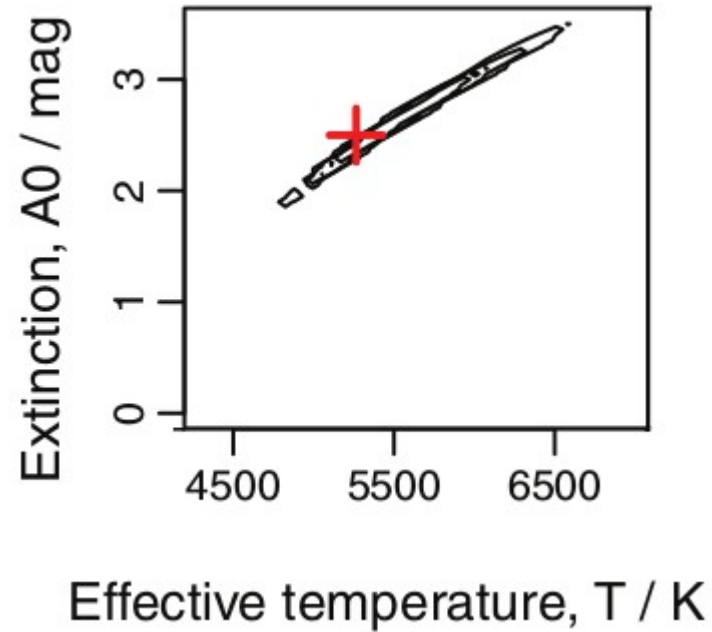


Photometric performances

	G mag	T_{eff} K	A_0 mag	$\log g$ dex	[Fe/H] dex
A stars	9	340	0.08	0.43	0.86
	15	260	0.06	0.38	0.93
	19	400	0.15	0.51	0.74
F stars	9	150	0.06	0.36	0.36
	15	170	0.07	0.38	0.33
	19	630	0.35	0.37	0.60
G stars	9	140	0.07	0.31	0.14
	15	140	0.07	0.22	0.16
	19	450	0.33	0.45	0.65
K stars	9	100	0.09	0.26	0.19
	15	90	0.08	0.26	0.21
	19	230	0.23	0.36	0.48
M stars	9	60	0.13	0.15	0.21
	15	70	0.14	0.29	0.25
	19	90	0.13	0.17	0.29

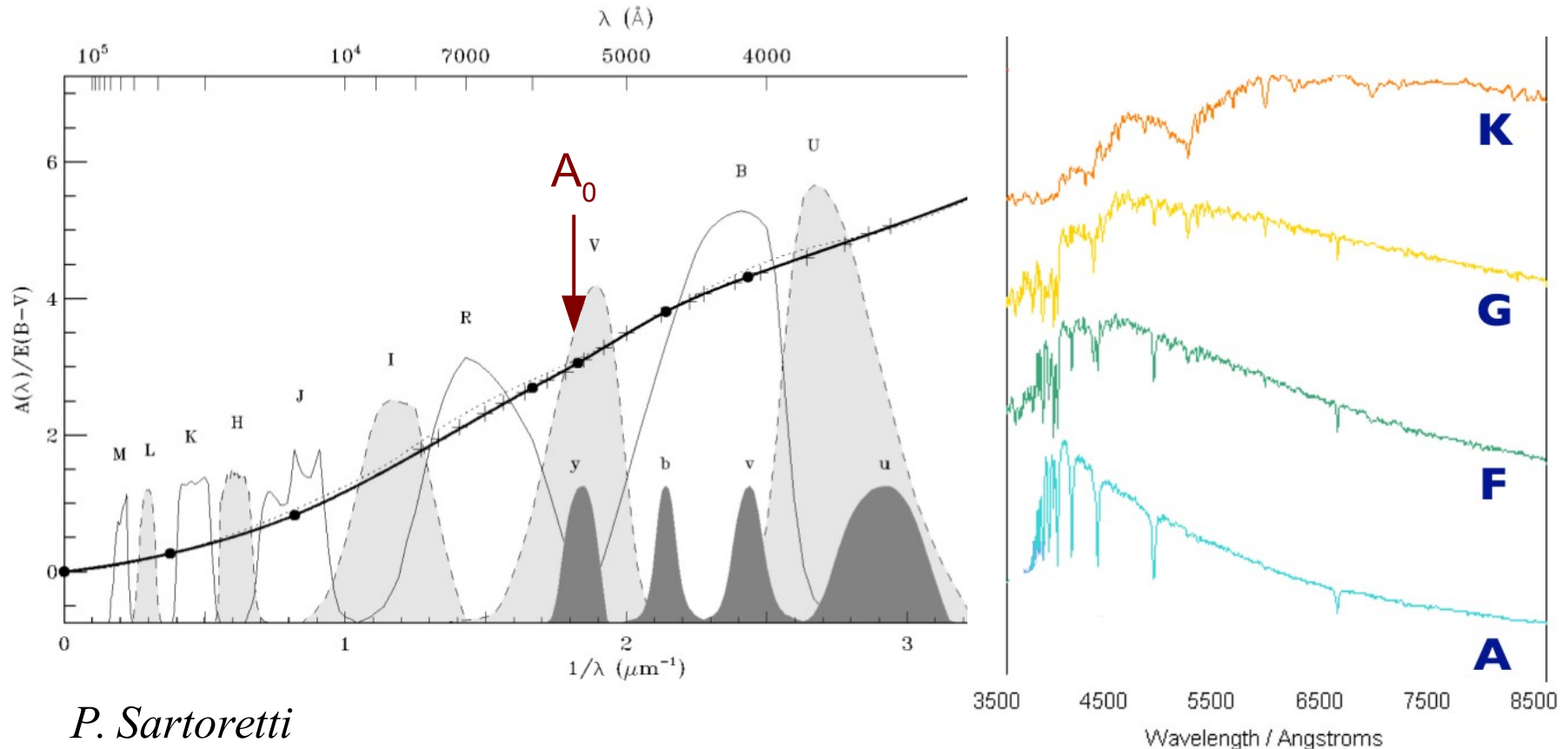


Correlations T_{eff} / A_0



Simulation of the photometry using :

- Stellar atmospheres (Basel2, Atlas, [Marcs], Phoenix in const)
- Extinction law (Cardelli 1989, Fitzpatrick & Massa 2007)
- Instrumental transmission (from U to K band)



- **Spectrophotometry**

 - atmospheric parameters + extinction

- **Spectroscopy**

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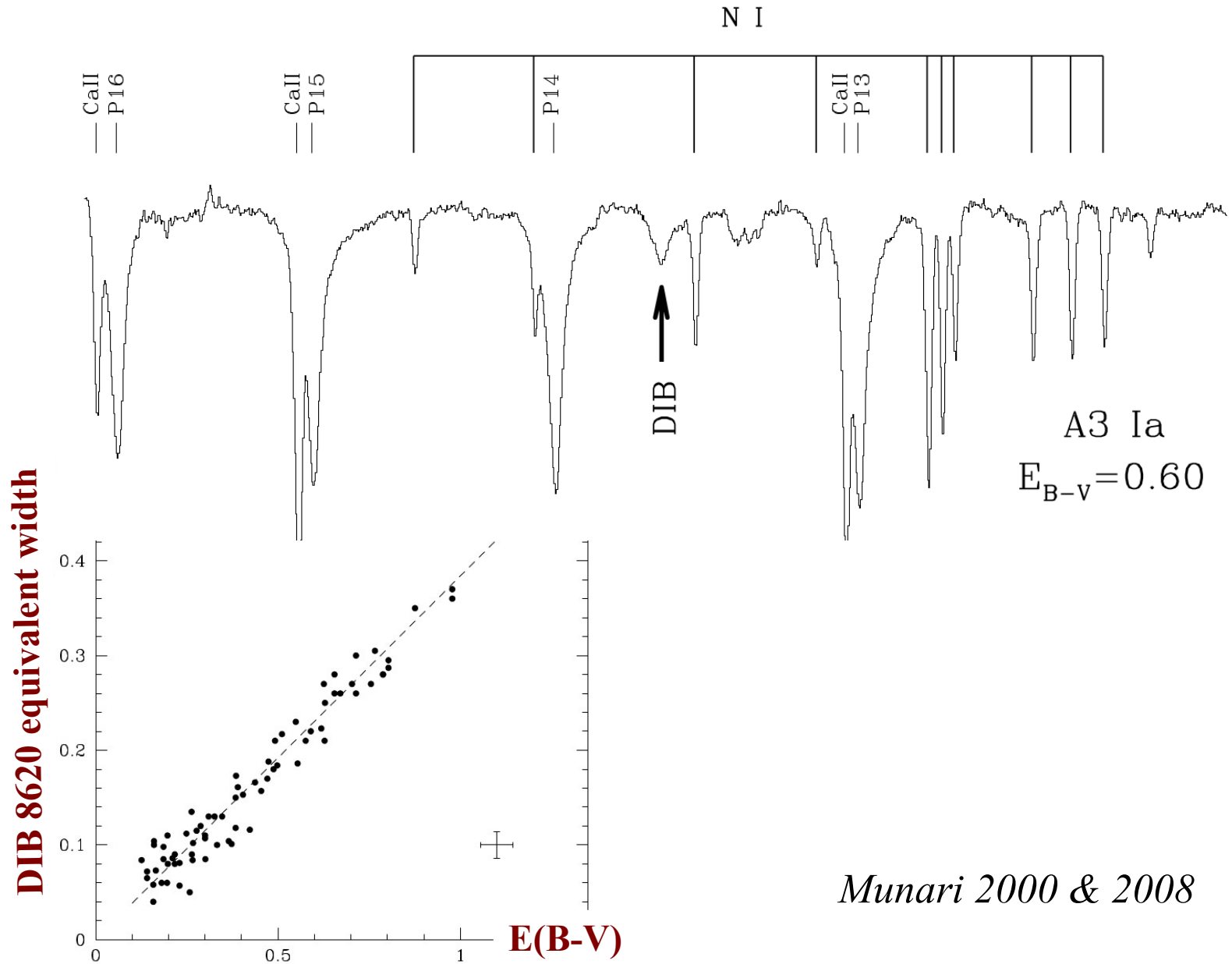
- **Astrometry**

 - distances → 3D ISM map

- **Spectroscopic HR follow-up**

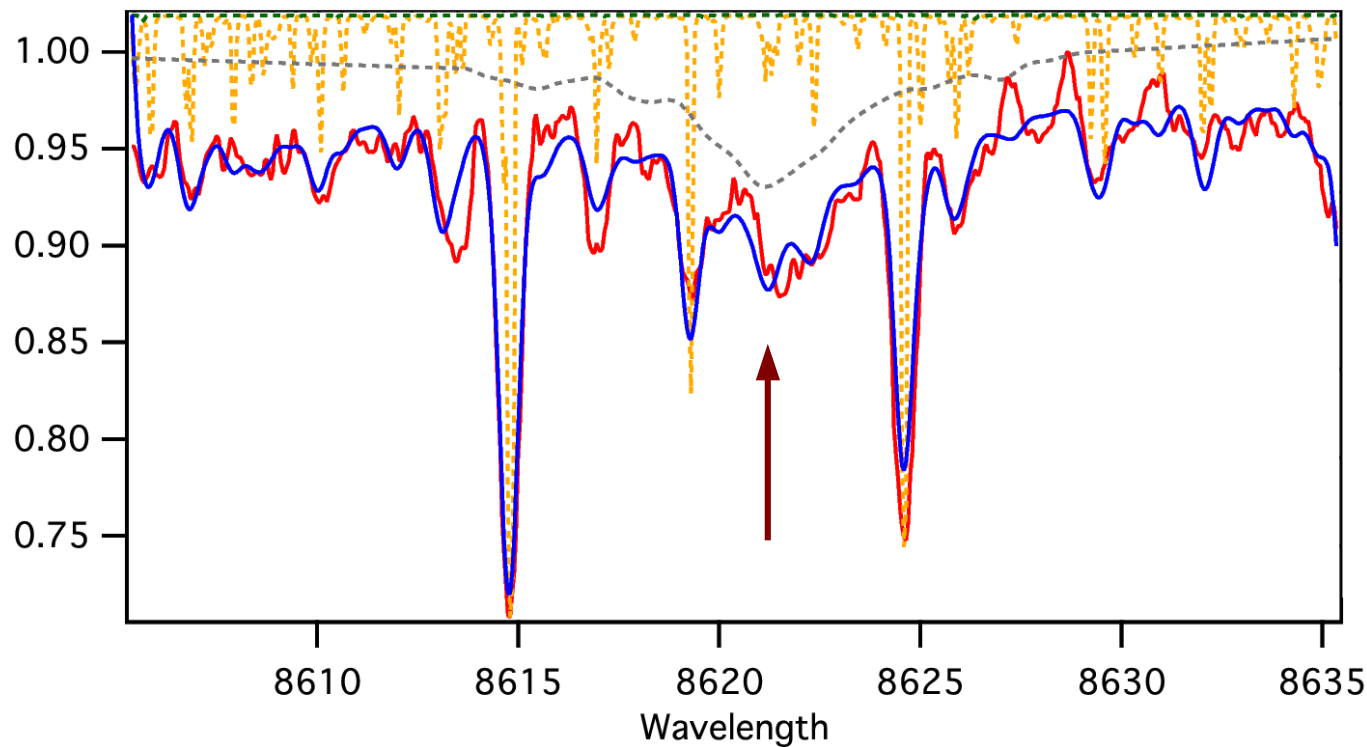
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→ extraction possible also for cool stars using

- synthetic spectra
- DIB template



GES spectra
GIRAFFE HR21

- **Spectrophotometry**

- atmospheric parameters + extinction

- **Spectroscopy**

- Diffuse Interstellar Band at 8620 Å

- **Astrometry**

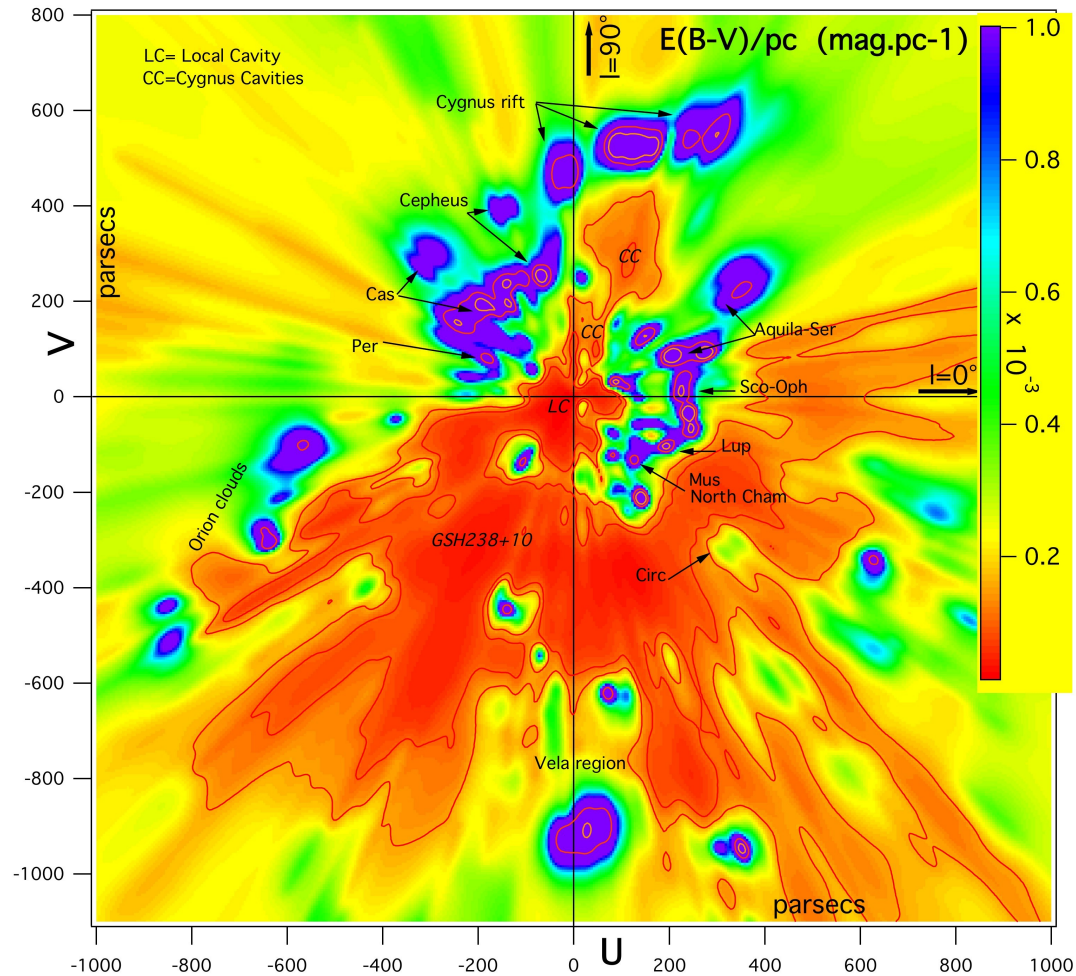
- distances → 3D ISM map

- **Spectroscopic HR follow-up**

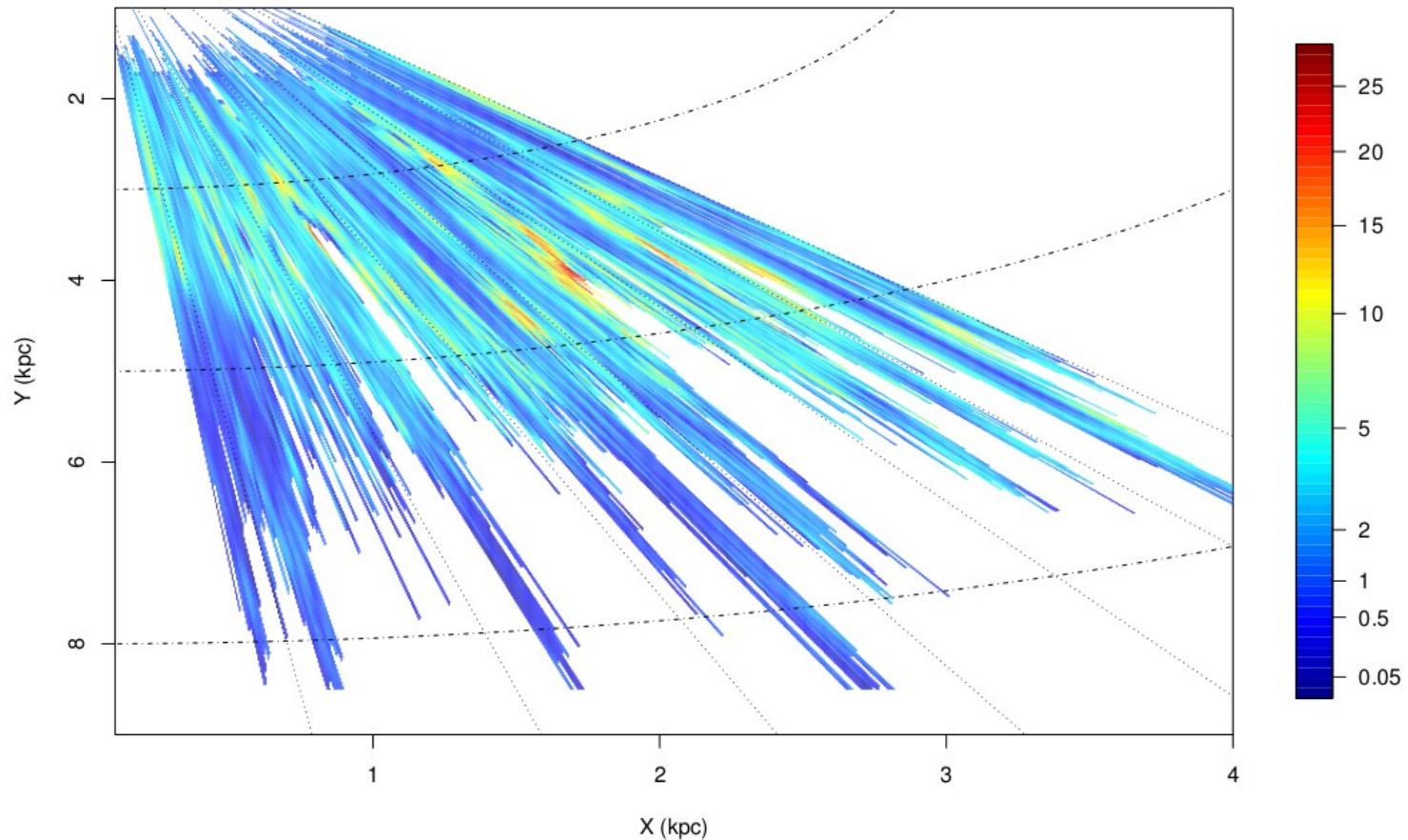
- IS lines, DIBs : intensity & Vr

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Inversion techniques using the parallaxes



Statistical methods will still be used at large distances



- **Spectrophotometry**

- atmospheric parameters + extinction

- **Spectroscopy**

- Diffuse Interstellar Band at 8620 Å

- **Astrometry**

- distances → 3D ISM map

- **Spectroscopic HR follow-up**

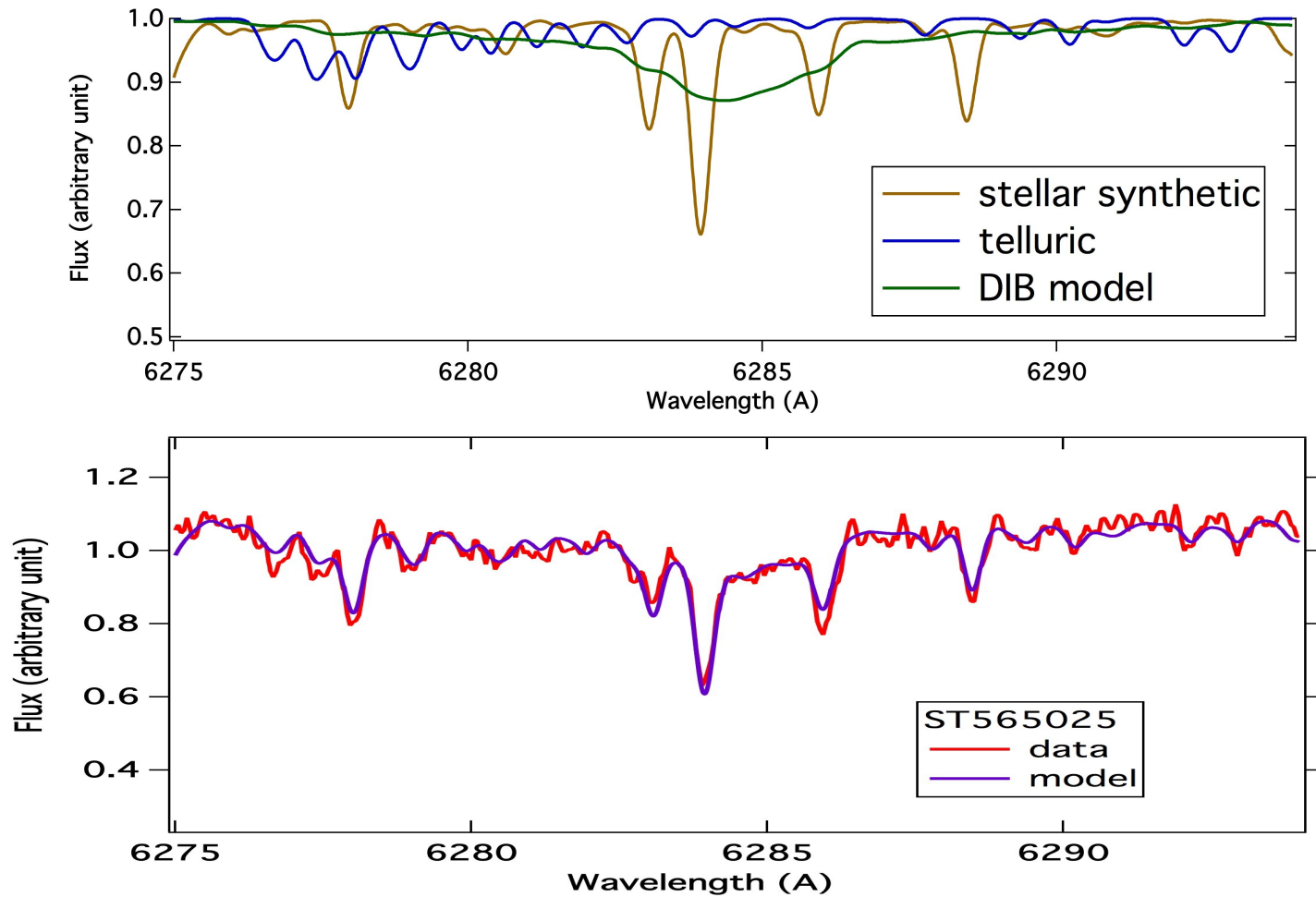
- IS lines, DIBs : intensity & Vr

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→ extraction of the IS lines and DIBs for all stars, including cool ones

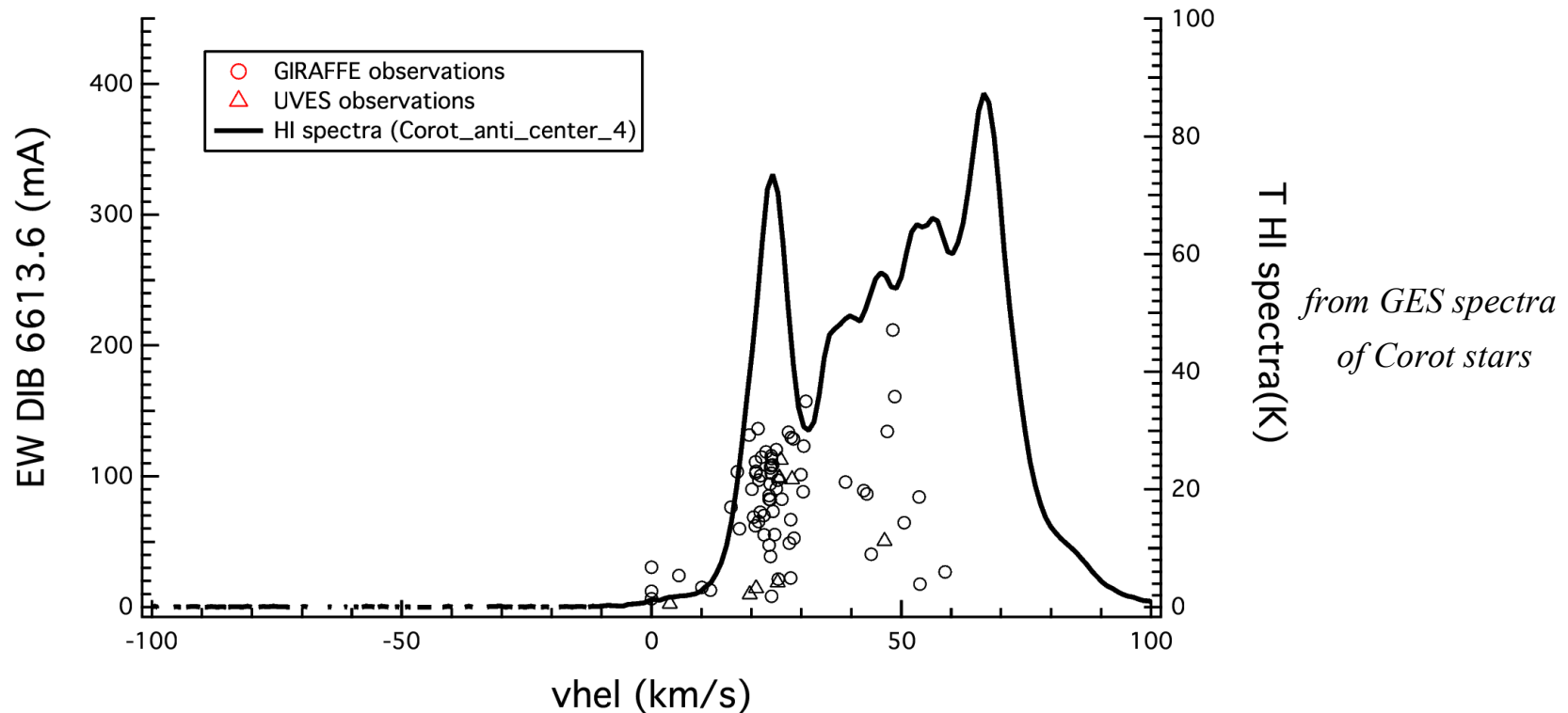
- **Synthetic stellar model spectrum** : ATLAS 9 - SYNTHE
- **Synthetic telluric absorption model spectrum** : from the TAPAS website
- **DIB template** derived from early-type nearby stars

Spectroscopic HR follow-up

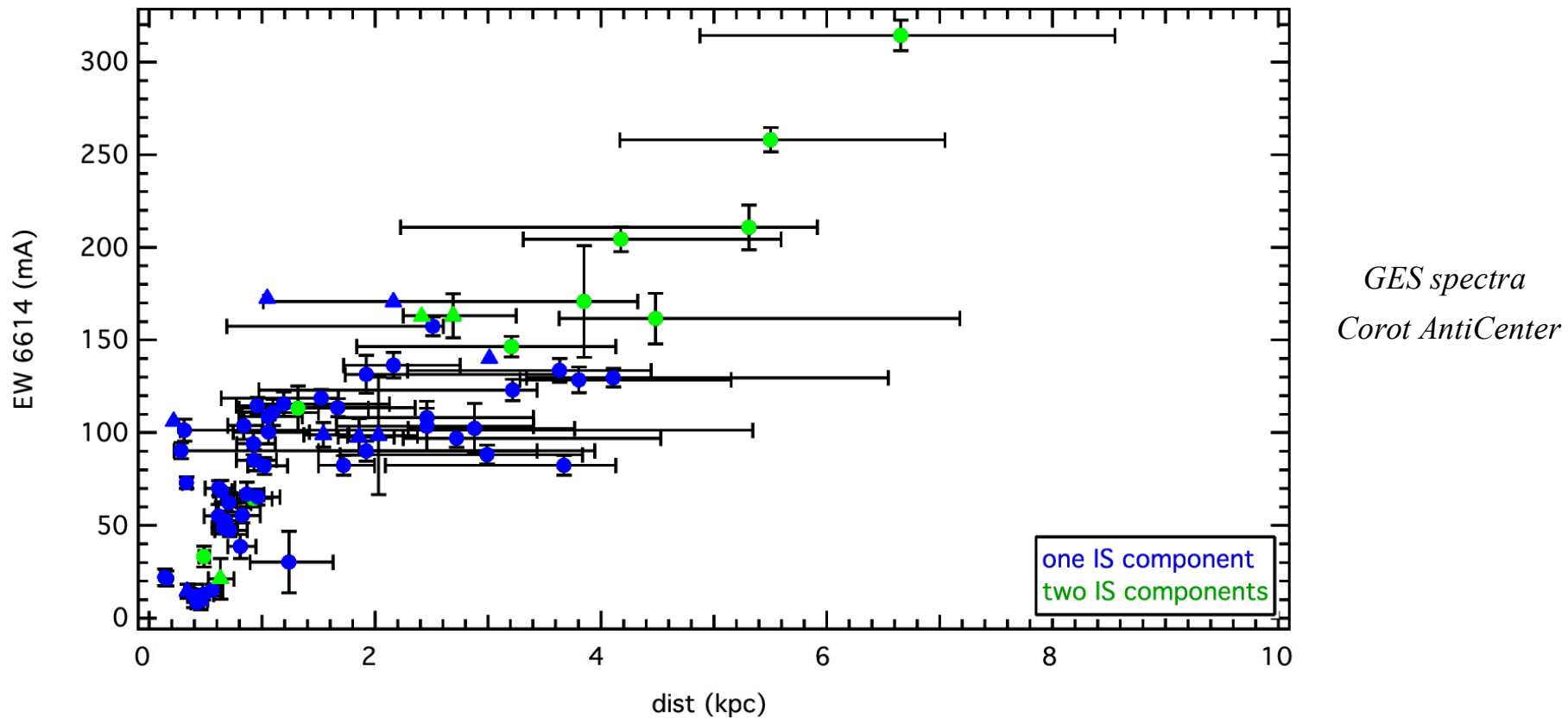


→ ISM absorption intensity + **radial velocity**

Multi-DIB fit : Vr starting points from Sodium lines or HI



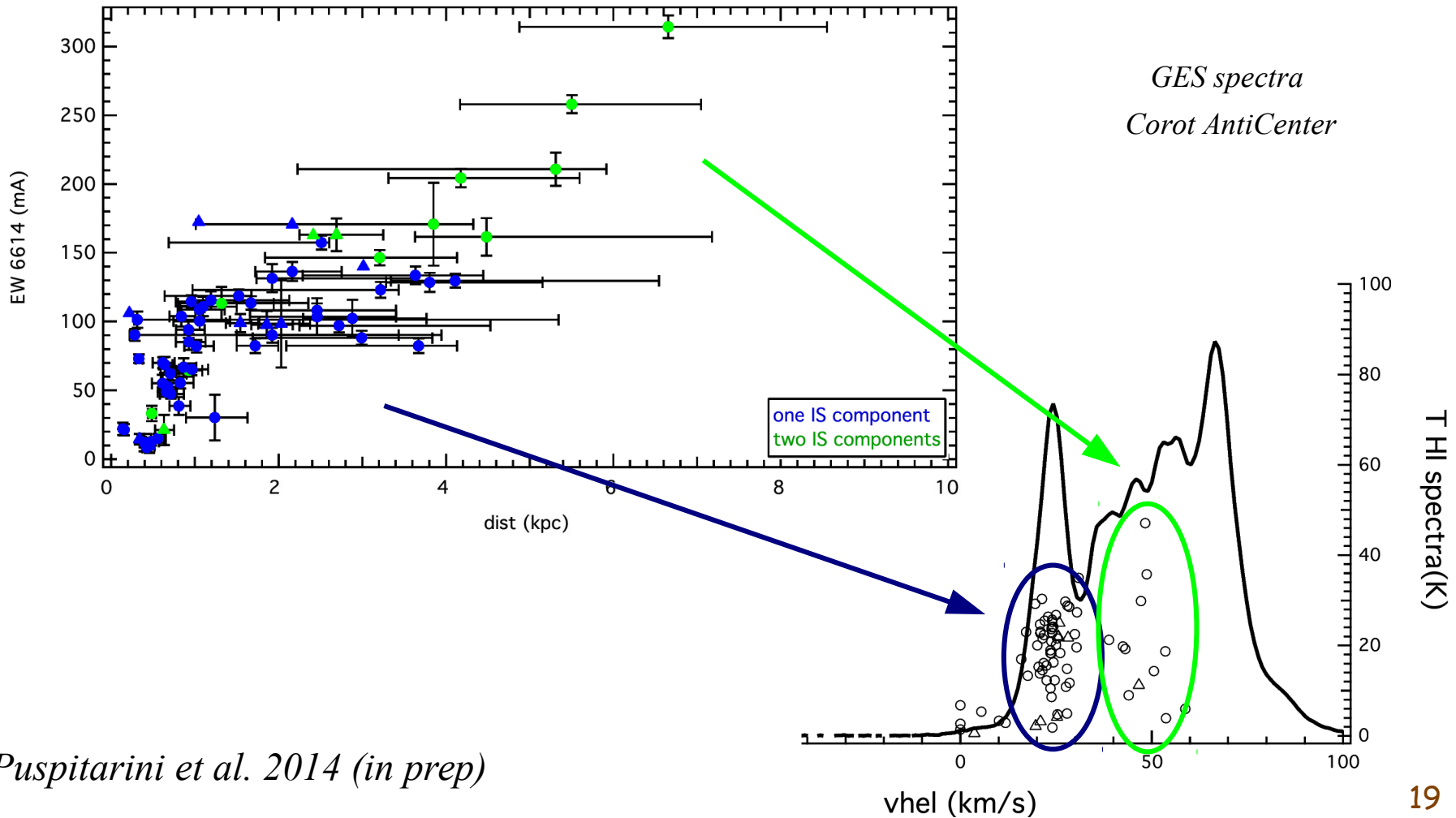
→ 4D map of the ISM



Puspitarini et al. 2014 (in prep)

Spectroscopic HR follow-up

→ 4D map of the ISM



Puspitarini et al. 2014 (in prep)

- **Spectrophotometry**

- atmospheric parameters + extinction

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→ **joint 4D study of stars & ISM structure will be possible**