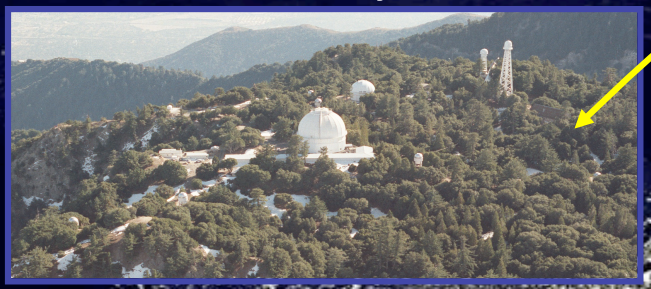
VEGA : Status, Science Overview and Future Plans

http://www-n.oca.eu/vega/en/publications/index.htm
VEGA : Mourard et al. (2009)

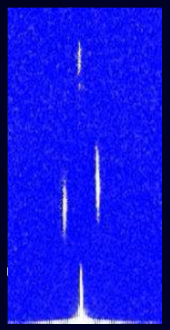
CHARA Array



Remote control

09-2007: Integration
07-2008: First science light
10-2008 : Mode 3T
07-2009: Remote operation
06-2010: First science papers
10-2010: Mode 4T
06-2013 : 17 publications
3T VEGA + IR instruments (CLIMB, MIRC)
30 programs, 50 nights per year

2013 : Service d'Observation labellisé
SO2 + S05 (http://www.jmmc.fr/job_offers.htm)
Instrument ouvert à la communauté



Mode 3T

Mode 4T

N. Nardetto, D. Mourard, K. Perraut
and all the VEGA team

Main characteristics of VEGA/CHARA

Spectrograph Characteristics

Grating	R	$\Delta\lambda$ (Blue)	$\Delta\lambda$ (Red)	$\lambda_R - \lambda_B$
R1: 1800 gr/mm	30 000	5 nm	8 nm	25 nm
R2: 300 gr/mm	5000	30 nm	45 nm	170 nm
R3: 100 gr/mm	1700	100 nm	150 nm	not possible

Magnitude limit R0=8cm R0=15cm

Resolution	R	Typical lim. magnitude	Best perf.
Low	1700	6.8	7.5
Medium	6000	6.5	7.5
High	30 000	4.2	5.5

→ **8 (r0=5cm) 21/09/12**

Two VEGA niches :

- **High angular resolution** (330m of baseline in optical = 0.3 mas)

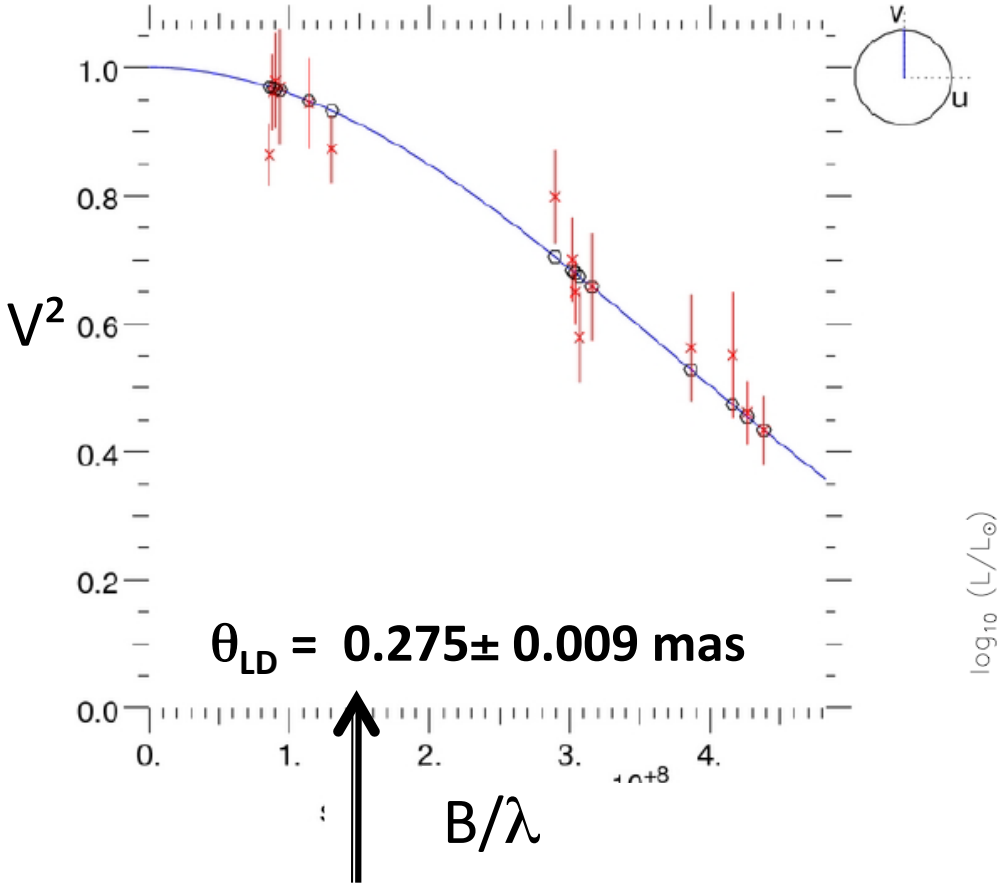
→ photospheric angular diameters, asteroseismology, binaries

- **High spectral resolution** (R = 30000)

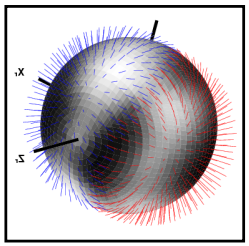
→ environment & kinematics, rotation, disks

10 Aql (RoAp) : Perraut et al. (submitted)

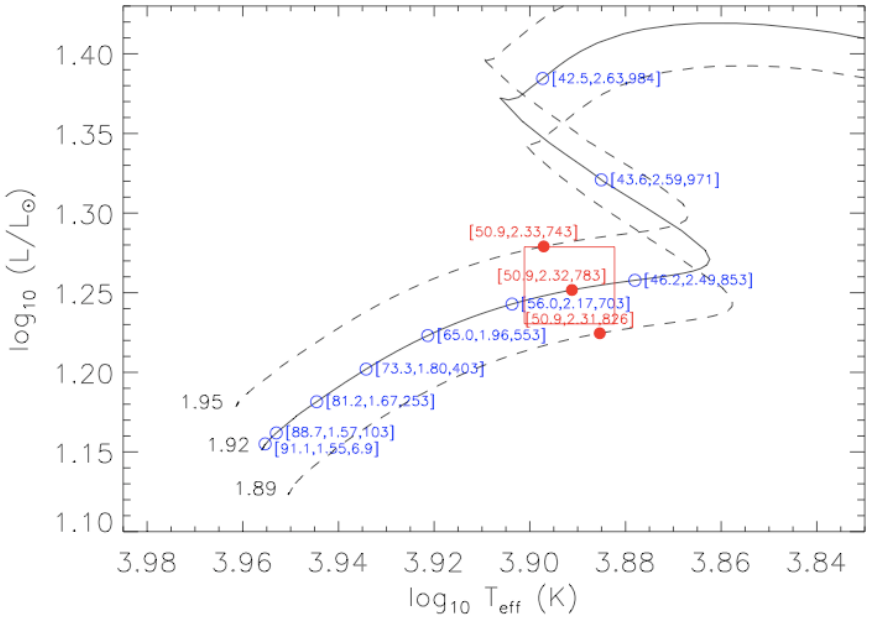
Determining the position of 10 Aql in the HR diagram to constrain Teff law (biased by spots) and also to better understand the pulsating mechanisms.



θ_{LD} = 0.275± 0.009 mas

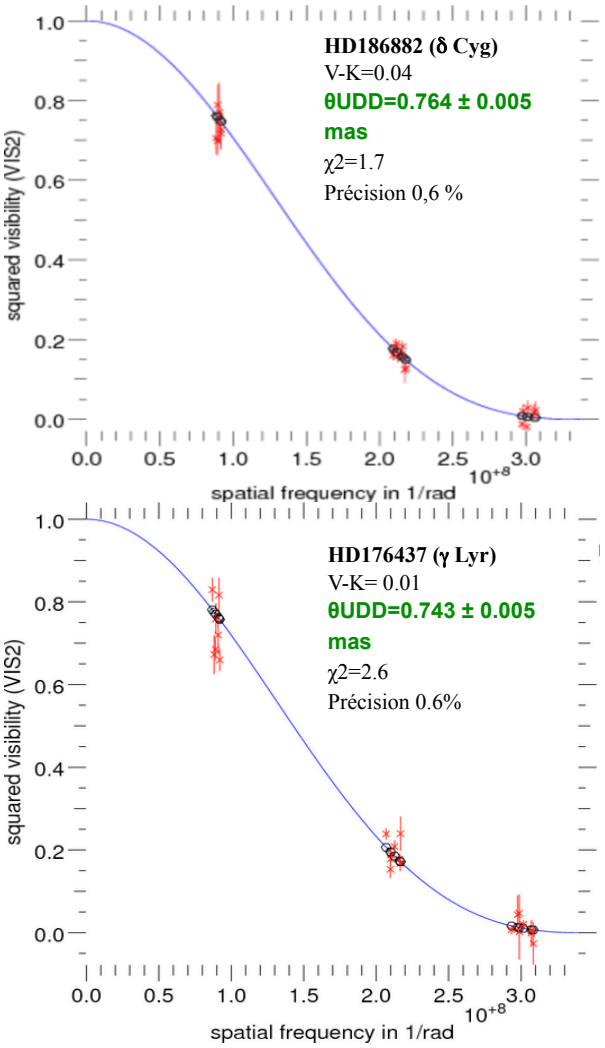


R = 2.318 ± 0.090 $R_\odot$



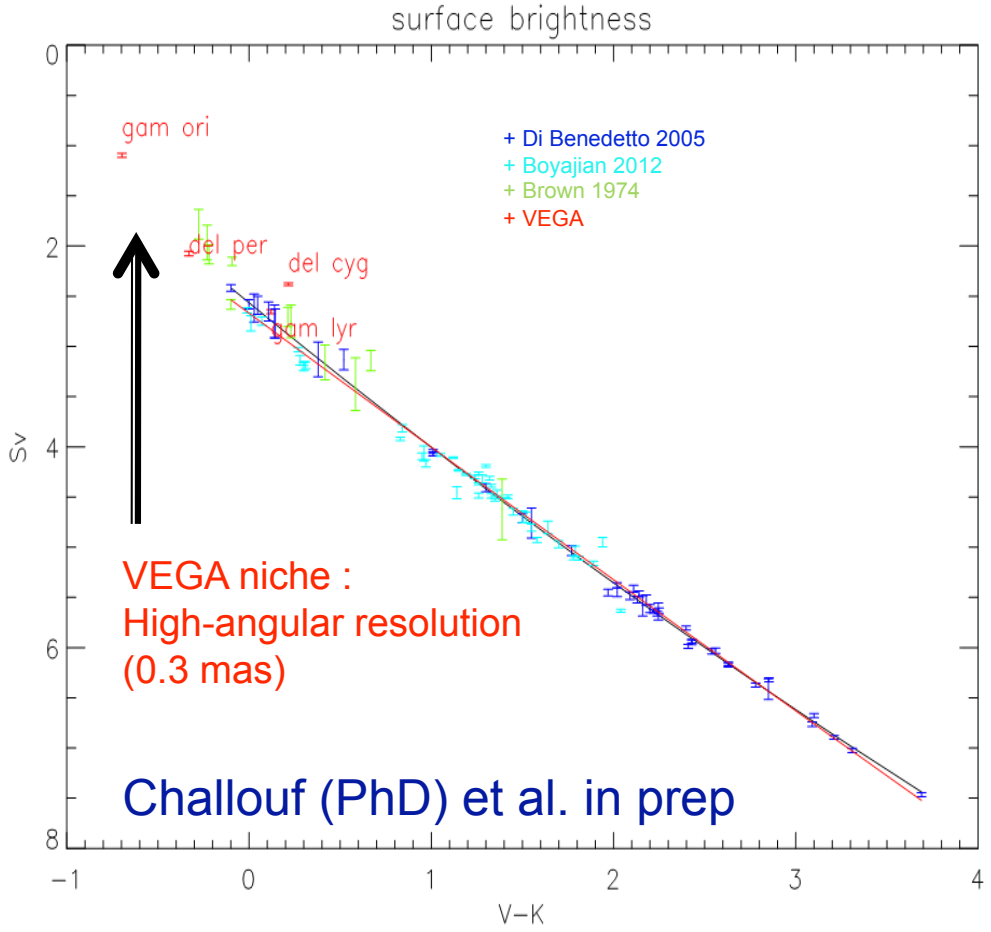
At the limit of the spatial resolution of VEGA (3% of precision)

Improving the surface brightness relation for the distance determination of Eclipsing Binaries in the Local Group (Araucaria Project: *Pietrzynski et al. 2013, Nature, 495, 76 (LMC distance at 2%)*



R+θ=d

The main limitation is the precision on θ (surface-brightness relation)



VEGA niche :
High-angular resolution
(0.3 mas)

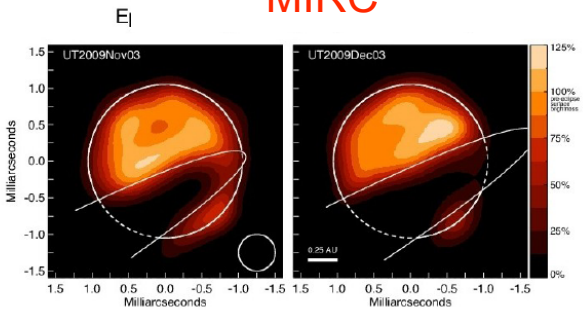
Challouf (PhD) et al. in prep

A high angular and spectral resolution view into the hidden companion of ε Aurigae*,**,***

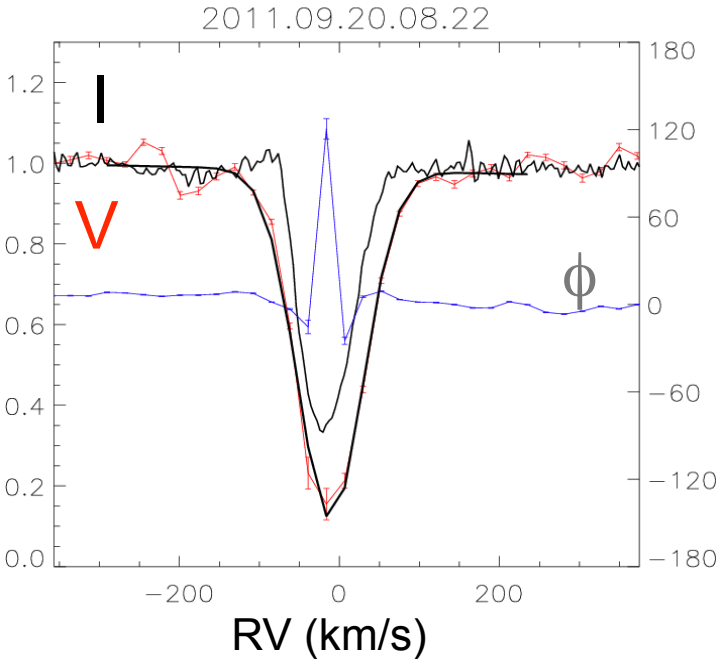
D. Mourard[1], P. Harmanec[2], R. Stencel[3], Ph. Bério[1], O. Chesneau[1], J. M. Clausse[1], R. Ligi[1], N. Nardetto[1], K. Perraut[4], Ph. Stee[1], I. Tallon-Bosc[5], H. McAlister[6,7], T. ten Brummelaar[7], S. Ridgway[8], J. Sturmann[7], L. Sturmann[7], N. Turner[7], C. Farrington[7], and P. J. Goldfinger[7]

VEGA

MIRC



VEGA niche :
Spectro-interferometry
(environment + kinematics)



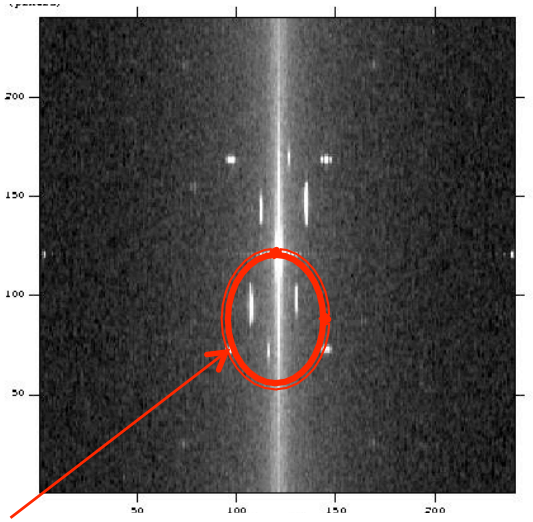
- Confirmation of dark disk and of its orbital motion
- Hα very close to the F star
- Existence of a wind and of a possible filling Roche lobe on the F atmosphere

Contributions sf2a liées à VEGA/CHARA

• Détection d'exoplanètes par transit et impact de l'activité stellaire en interférométrie optique
Roxanne Ligi (PhD) : S04

• Perspective instrumentale en interférométrie optique
Philippe Berio : S04

« VEGAS » : instrument à fibre
+ nouvelle caméra OCAM pour optimiser l'installation prochaine d'OA sur CHARA (gain en magnitude limite & sensibilité).



Merci pour votre attention

Calern meeting, february 6th, 2012