Les travaux d'Olivier Chesneau
Les étoiles massives

“La physique des étoiles évoluées”
Conférence en mémoire d'Olivier Chesneau
F. Millour

Les travaux d'Olivier Chesneau
Les étoiles massives

“La physique des étoiles évoluées”
Conférence en mémoire d'Olivier Chesneau
F. Millour

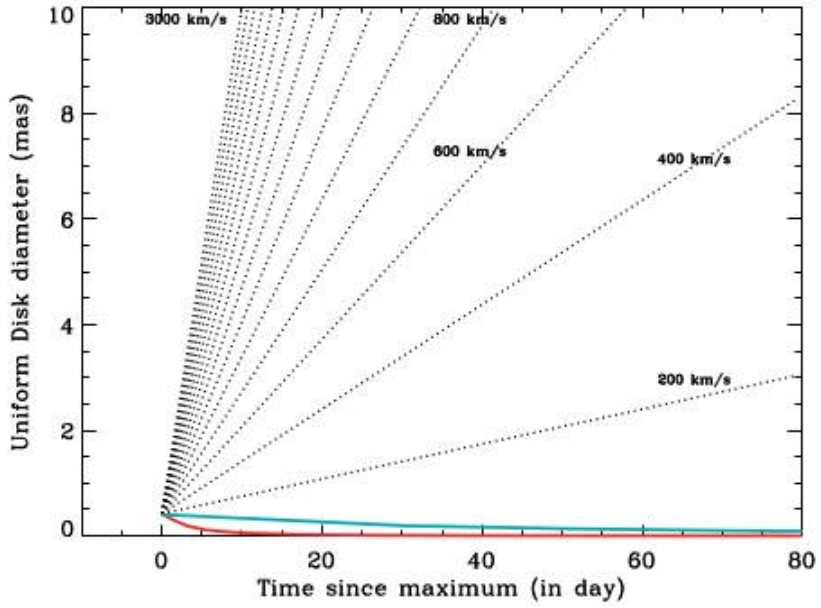
“Ta présentation est soignée, comme d'hab.”
O. Chesneau

Les travaux d'Olivier Chesneau
Les étoiles massives

“La physique des étoiles évoluées”
Conférence en mémoire d'Olivier Chesneau
F. Millour

Mais d'abord:
Le travail sur les novae...

Le rêve d'Olivier ...



Chesneau et Banerjee 2012

- Mesurer le taux d'expansion apparent de la boule de feu sur le fond du ciel et répondre à la question récurrente : à quelle distance explosent les novae?
- “Imager” la forme de la boule de feu de la nova : est-elle sphérique ou bipolaire ?

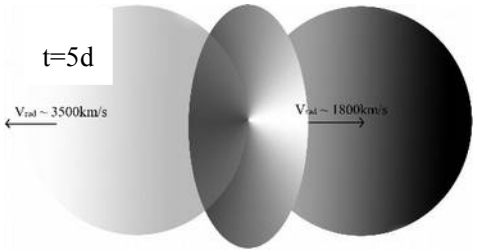
“Imager” la forme de la boule de feu

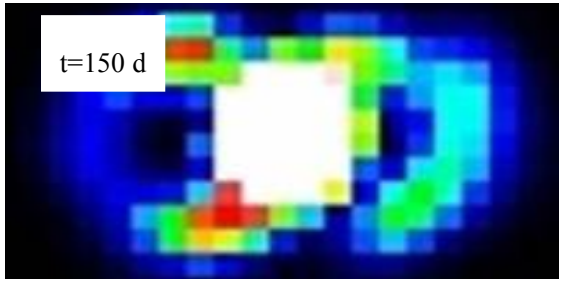
RS Oph:

O’Brien et al. 2006,

Chesneau et al. 2007,

Bode et al. 2008…



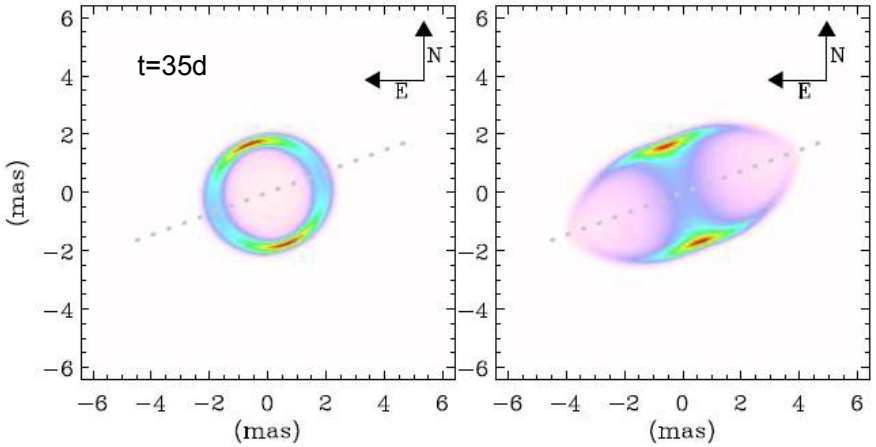


T Pyx:

Une nébuleuse bipolaire

vue de face

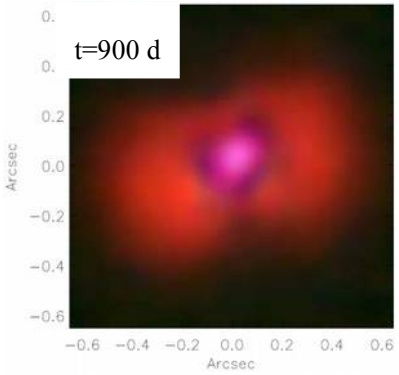
Chesneau et al., 2011



V1280 Sco:

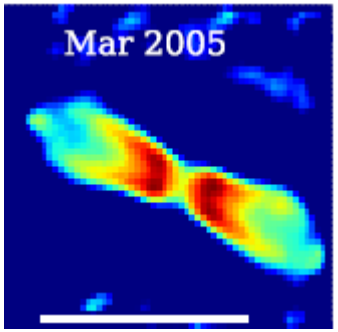
Chesneau et al. 2008,

Chesneau et al. 2012



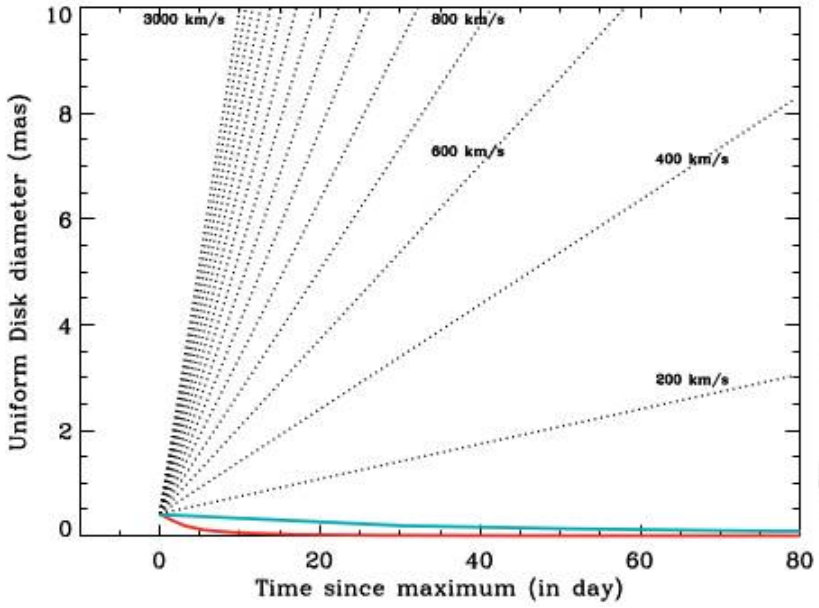
V445 Pup:

Woudt et al. 2009



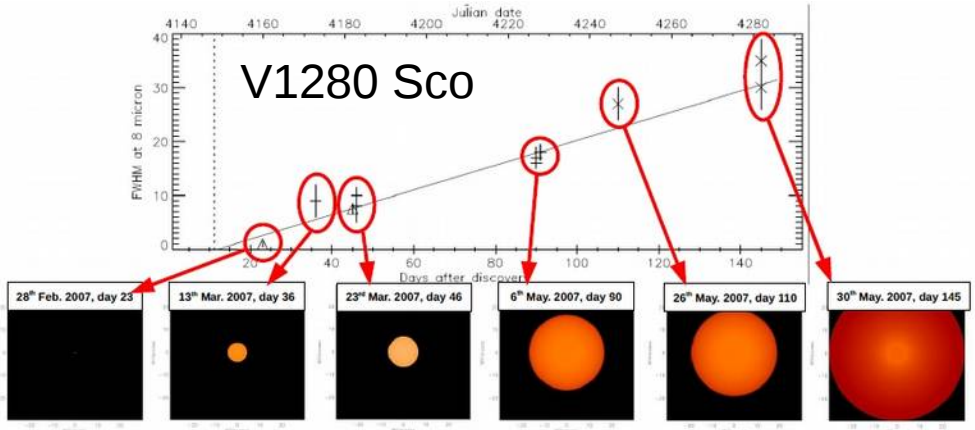
Mesurer le taux d'expansion apparent de la boule de feu

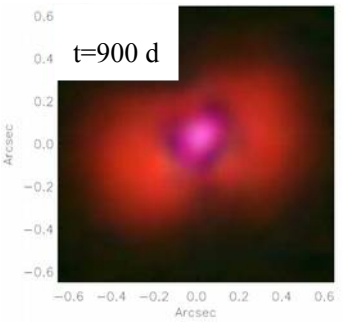
Le rêve d'Olivier ...



Chesneau et Banerjee 2012

… 1e tentative
Et de grosses difficultés à obtenir du temps sur le VLTI

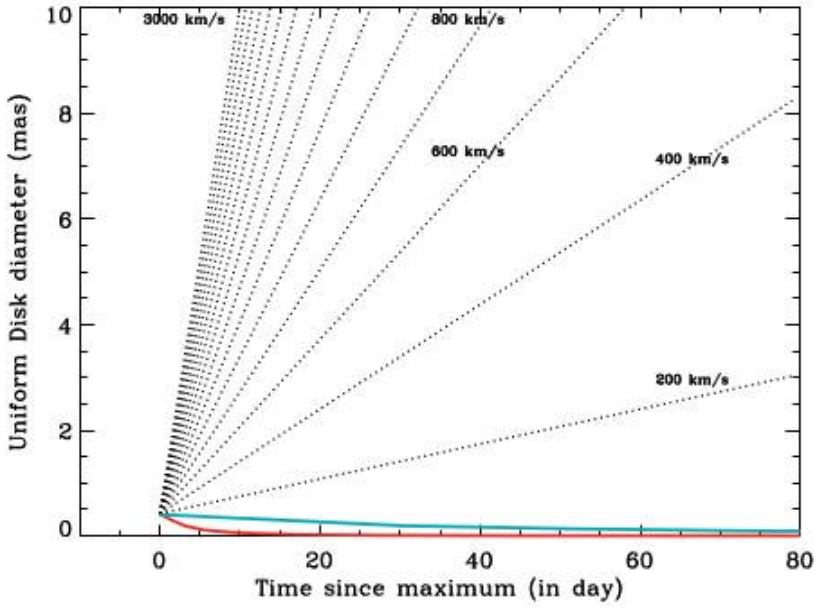




Chesneau et al. 2008, 2012

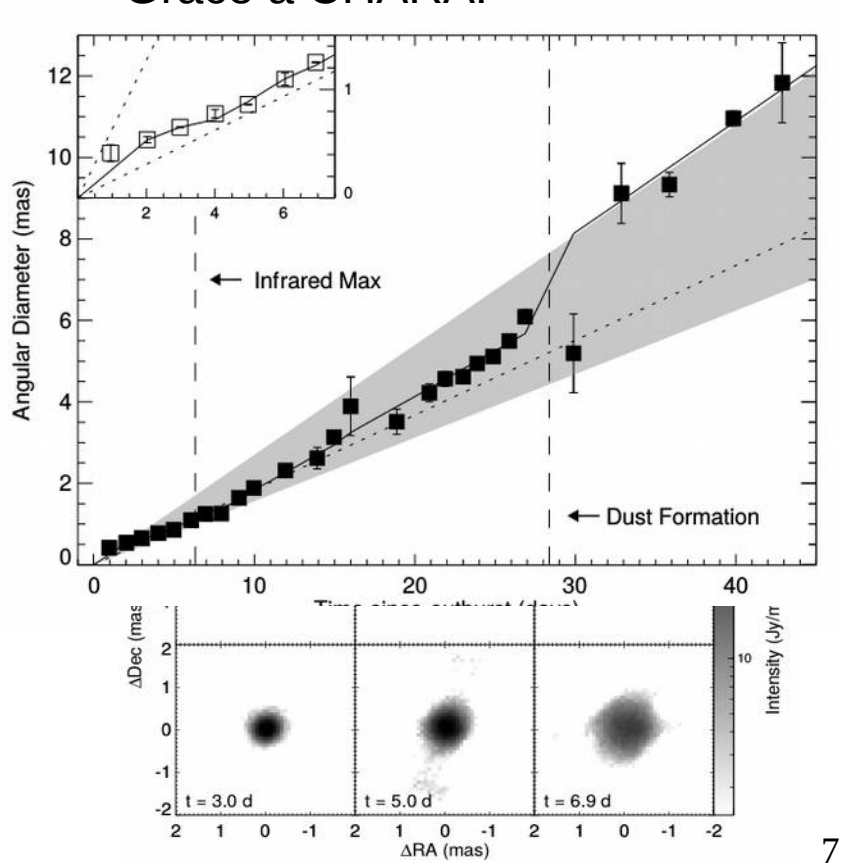
Mesurer le taux d'expansion apparent de la boule de feu

Le rêve d'Olivier ...



Chesneau et Banerjee 2012

… est devenu réalité
Grâce à CHARA!



Schaeffer et al. 2014

Le travail sur les novae...

Cité dans 41 autres articles

A&A 464, 119–126 (2007)
DOI: 10.1051/0004-6361:20066022

AMBER/VLTI interferometric observations of the recurrent Nova RS Ophiuchii 5.5 days after outburst⋆

O. Chesneau[1], N. Nardetto[1,2], F. Millour[3,4], C. Hummel[5], A. Domiciano de Souza[3], D. Bonneau[1], M. Vannier[5,6], F. Rantakyrö[5], A. Spang[1], F. Malbet[4], D. Mourard[1], M. F. Bode[7], T. J. O'Brien[8], G. Skinner[9], R. G. Petrov[3], P. Ste
E. Tatulli[10], and F. Vakili[3]

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[2] Max-Planck-Institut für Radioastronomie, Auf dem Hügel 69, 53121 Bonn, Germany
[3] Laboratoire Universitaire d'Astrophysique de Nice, UMR 6525 Université de Nice – Sophia Antipolis/CNRS, Parc Valrose, 06108 Nice Cedex 2, France
[4] Laboratoire d'Astrophysique de Grenoble, UMR 5571 Université Joseph Fourier/CNRS, BP 53, 38041 Grenoble Cedex 9, France
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[6] Departamento de Astronomia, Universidad de Chile, Chile
[7] Astrophysics Research Institute, Liverpool John Moores University, Birkenhead, CH41 1LD, UK
[8] Jodrell Bank Observatory, School of Physics and Astronomy, Univ. of Manchester, Oxford Street, Manchester M13 9PL, UK
[9] CESR, 31028 Toulouse, France and Univ. P
[10] INAF

Cité dans 29 autres articles

A&A 487, 223–235 (2008)
DOI: 10.105
© ESO 2008

VLTI monitoring of the dust formation event of the Nova V1280 Scorpii⋆

O. Chesneau[1], D. P. K. Banerjee[2], F. Millour[3], N. Nardetto[3], S. Sacuto[1], A. Spang[1], M. Wittkowski[4], N. M. Ashok[2], R. K. Das[2], C. Hummel[4], S. Kraus[3], E. Lagadec[5], S. Morel[6], M. Petr-Gotzens[4], F. Rantakyro[6], and M. Schöller[6]

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[3] Max-Planck-Institut für Radioastronomie, Auf dem Hügel 69, 53121 Bonn, Germany
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Received 30 January 2008 / Accepted 25 April 2008

ABSTRACT

Context. We present the first high spatial-resolution monitoring of the dust-forming nova V1280 Sco, performed with the Very Large

Cité dans 13 autres articles

A&A 545, A63 (2012)
DOI: 10.1051/0004-6361/201219825

The expanding dusty bipolar nebula around the nova V1280 Scorpi⋆

O. Chesneau[1], E. Lagadec[2], M. Otulakowska-Hypka[3], D. P. K. Banerjee[4], C. E. Woodward[5], E. Harvey[1], A. Spang[1], P. Kervella[6], F. Millour[1], N. Nardetto[1], N. M. Ashok[4], M. J. Barlow[7], M. Bode[8], A. Evans[9], D. K. Lynch[10], T. J. O'Brien[11], R. J. Rudy[10], and R. W. Russell[10]

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Received 15 June 2012 / Accepted 17 July 2012

ABSTRACT

Context. The fast temporal evolution of the ejecta morphology of novae can be considered as an important test bench for studying the shaping of many kinds of nebulae. V1280 Sco is one of the slowest dust-forming nova ever historically observed that has experienced a particularly long common-envelope phase.
Aims. We performed multi-epoch high-spatial resolution observations of the circumstellar dusty environment of V1280 Sco to investigate the level of asymmetry of the ejecta.
Methods. We observed V1280 Sco in 2009, 2010 and 2011 (from t = 877 days after discovery until t = 1664 d) using unprecedented high angular resolution techniques. We used the NACO/VLT adaptive optics system in the J, H and K bands, together with contemporaneous VISIR/VLT mid-IR imaging that resolved the dust envelope of V1280 Sco, and SINFONI/VLT observations covered in 201

Cité dans 34 autres articles

534, L11 (2011)
10.1051/0004-6361/201117792
SO 2011

The 2011 outburst of the recurrent nova T Pyxidis. Evidence for a face-on bipolar ejection

O. Chesneau[1], A. Meilland[1], D. P. K. Banerjee[2], J.-B. Le Bouquin[3], H. McAlister[4,5], F. Millour[1], S. T. Ridgway[6], A. Spang[1], T. ten Brummelaar[5], M. Wittkowski[7], N. M. Ashok[2], M. Benisty[8], J.-P. Berger[9], T. Boyajian[4], Ch. Farrington[5], P. J. Goldfinger[5], A. Merand[9], N. Nardetto[1], R. Petrov[1], Th. Rivinius[9], G. Schaefer[4], Y. Touhami[4], and G. Zins[3,⋆]

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Received 29 July 2011 / Accepted 28 September 2011

ABSTRACT

Aims. T Pyx is the first recurrent nova ever historically studied. It was seen in outburst six times between 1890 and 1966 and then not for 45 years. We report on near-IR interferometric observations of the recent outburst of 2011.
Methods. We obtained near-IR observations of T Pyx at dates ranging from t = 2.37 d to t = 48.2 d after the outburst, with the

Quelle est l'influence du travail d'Olivier Chesneau?

La bibliothèque des atronomes : NASA ADS (base de données d'articles)

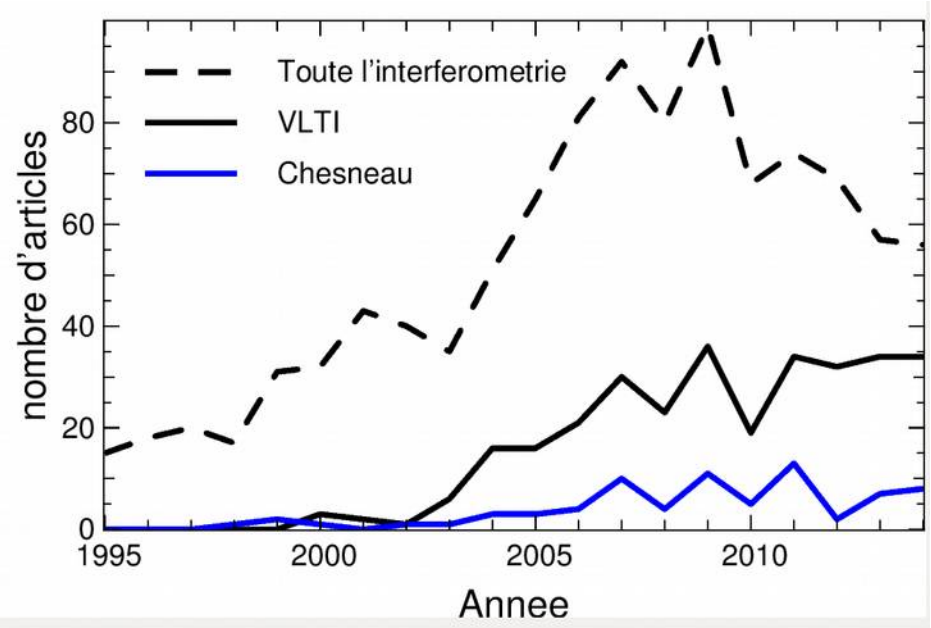
SAO/NASA Astrophysics Data System (ADS)

Query Results from the ADS Database

Selected and retrieved **262** abstracts. Total citations: **2692**

Chesneau, Olivier | Search again

97 articles à comité de lecture
25 citations par article en moyenne !



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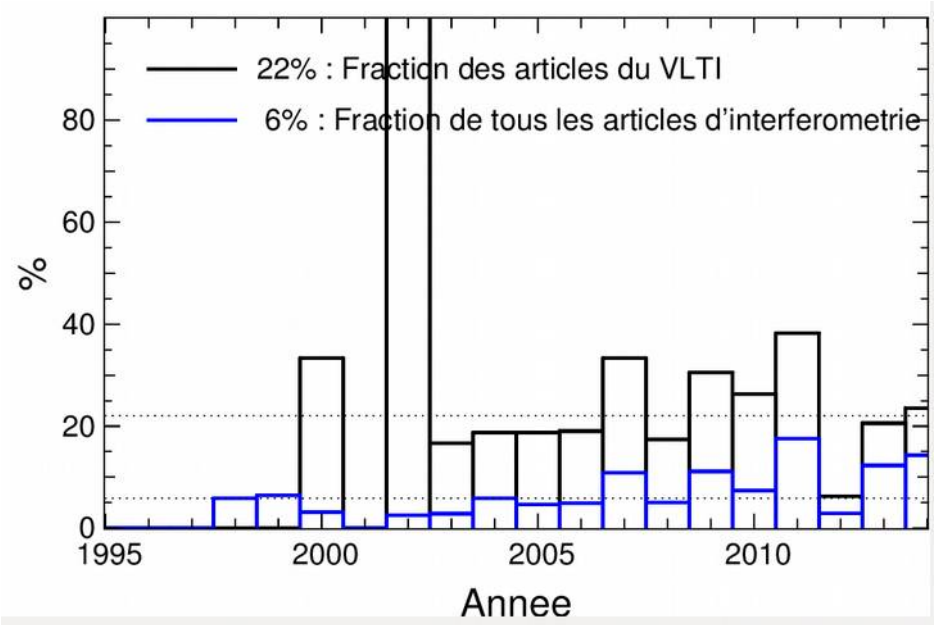

Le travail sur les étoiles chaudes...

Cité dans 40 autres articles

A&A 435, 1043–1061 (2005)
DOI: 10.1051/0004-6361:20041395

The sub-arcsecond dusty environment of Eta Carinae*

O. Chesneau[1], M. Min[2], T. Herbst[1], L. B. F. M. Waters[2], D. J. Hillier[3], Ch. Leinert[1], A. de Koter[2], I. Pascucci[1], W. Jaffe[4], R. Köhler[1], C. Alvarez[1], R. van Boekel[2], W. Brandner[1], U. Graser[1], A. M. Lagrange[5], R. Lenzen[1], S. Morel[6], and M. Schöller[6]

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Southern Observatory, Casilla 19001, Santiago, Chile

Cité dans 13 autres articles

Hot stars mass-loss studied with Spectro-Polarimetric INterferometry (SPIN)

O. Chesneau[1], S. Wolf[2], and A. Domiciano de Souza[3]

[1] Max-Planck-Institut für Astronomie, Königstuhl 17, 69117 Heidelberg, Germany
[2] California Institute of Technology, 1200 E California Blvd., Mail code 105-24, Pasadena, CA 91125, USA
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Département d'Astrophysique de l'Université de Nice/Sophia-Antipolis, CNRS UMR 6525, France
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eceived 12 February 2003 / Accepted 18 July 2003

bstract. We present a prospective work undertaken on Spectro-Polarimetric INterferometry (SPIN). Our theoretical studies ggest that SPIN is a powerful tool for studying the mass loss from early type stars where

Cité dans 37 autres articles

A&A 435, 275–287 (2005)
DOI: 10.1051/0004-6361:20041954

First VLTI/MIDI observations of a Be star: Alpha Arae

O. Chesneau[1,2], A. Meilland[2], T. Rivinius[3], Ph. Stee[2], S. Jankov[4], A. Domiciano de Souza[5], U. Graser[1], E. Janot-Pacheco[6], R. Koehler[1], C. Leinert[1], S. Morel[7], F. Paresce[7], A. Richichi[7], and S. Robbe-Du

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e-mail: Olivier.Chesneau@obs-azur.fr
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[6] Instituto de Astronomia, Geofísica e Ciências Atmosféricas da Universidade de São Paulo (IAG-USP), CP 9638, 01065-970 São Paulo, Brazil
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Received 6 September 2004 / Accepted 5 January 2005

Abstract. We present the first VLTI/MIDI observations of the Be star alpha Ara (HD 158 427), showing a nearly unresolv circumstellar disk in the *N* band. The interferometric measurements made use of the UT1 and UT3 telescopes. The project baselines were 102 and 74 meters with position angles of 7° and 55°, respectively. These measurements put an upper limit the envelope size in the *N* band under the uniform disk approximation of $\phi_{\rm max} = 4 \pm 1.5$ mas, corresponding to 14 $R_\star$, assumi $R_\star = 4.8\,R_\odot$ and the Hipparcos distance of 74 pc.
On the other hand the disk density must be large enough to produce the observed strong Balmer line emission. In order estimate the possible circumstellar and stellar parameters we have used the SIMECA code developed by Stee et al. (199 A&A, 300, 219) and Stee & Bittar (2001, A&A, 367, 532). Optical spectra taken with the échelle instrument HEROS and th ESO-50 cm telescope, as well as infrared ones from the 1.6m Brazilian telescope were used together with the MIDI spectra an visibilities. These observations place complementary constraints on the density and geometry of the alpha Ara circumstella disk. We discuss the potential truncation of the disk by a companion and we present spectroscopic indications of a periodi perturbation of some Balmer lines.

Key words.

Cité dans 15 autres articles

A&A manuscript no.
(will be inserted by hand later)
Your thesaurus codes are:
06 (03.09.7; 08.03.4; 08.09.1; 08.09.2; 08.23.3)

ASTRONOMY AND ASTROPHYSICS
January 18, 2014

Adaptive Optics imaging of P Cyg in H_α *

Chesneau O.[1], Roche M.[2], Boccaletti A.[3], Abe L.[1], Moutou C.[4], Charbonnier F.[5], Aime C.[2], Lantéri H.[2], and Vakili F.[1]

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Received January 10; accepted March 20, 2000

Abstract. We obtained H_α diffraction limited data of the LBV star P Cyg using the ONERA Adaptive Optics (AO) facility BOA at the OHP 1.52m telescope on October 1997. Taking P Cyg and the reference star 59 Cyg AO long exposures we find that P Cyg clearly exhibits a large and diffuse intensity distribution compared to the 59 Cyg's point-like source. A deconvolution of P Cyg using 59 Cyg as the Point Spread Function was performed by means of the Richardson-Lucy algorithm. P Cyg clearly appears as an unresolved star surrounded by a clumped envelope. The reconstructed image of P Cyg is compared to simi-

who estimate its mass as 0.01 solar mass. This value significantly differs from those of more regular LBVs, ranging from $1 M_\odot$ to $4.2 M_\odot$ (e.g. for AG Car) which also present more asymmetric nebula.

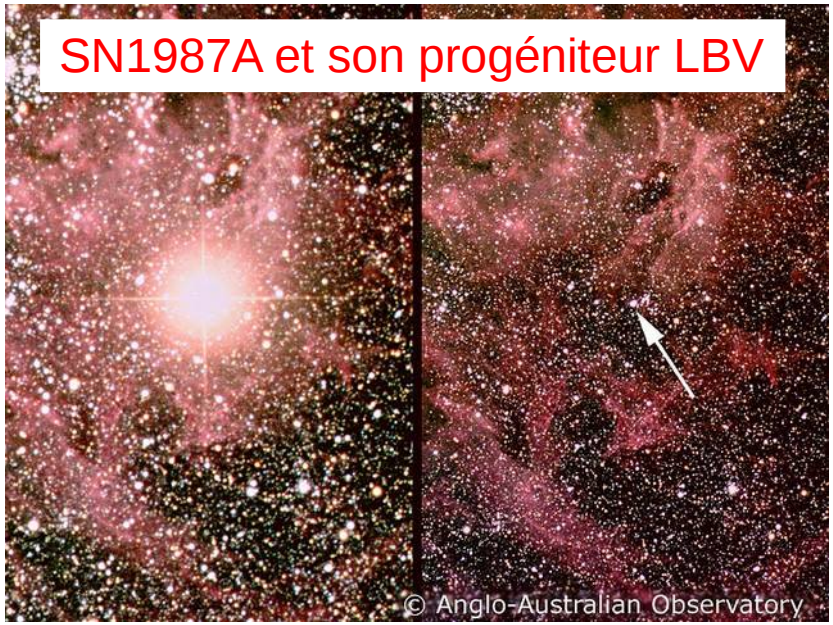
Evolutive tracks suggest an initial mass of $48 \pm 6\ M_\odot$, and it's present mass is estimated to be at the most 40 $M_\odot$, but lower masses ($\sim 30\ M_\odot$) are also reported in literature (Lamers et al. 1983, Lamers et al. 1985, and Turner et al. 1999). However, the fine spatial structure of this large amount of excreted matter remains to be detailed. P Cyg's relative proximity ($\sim$ 1.8 kpc, represents an opportunity to observe

Pourquoi s'intéresser aux étoiles chaudes ?

- « Classification » à partir de la spectroscopie, recouvre de nombreux stades évolutifs

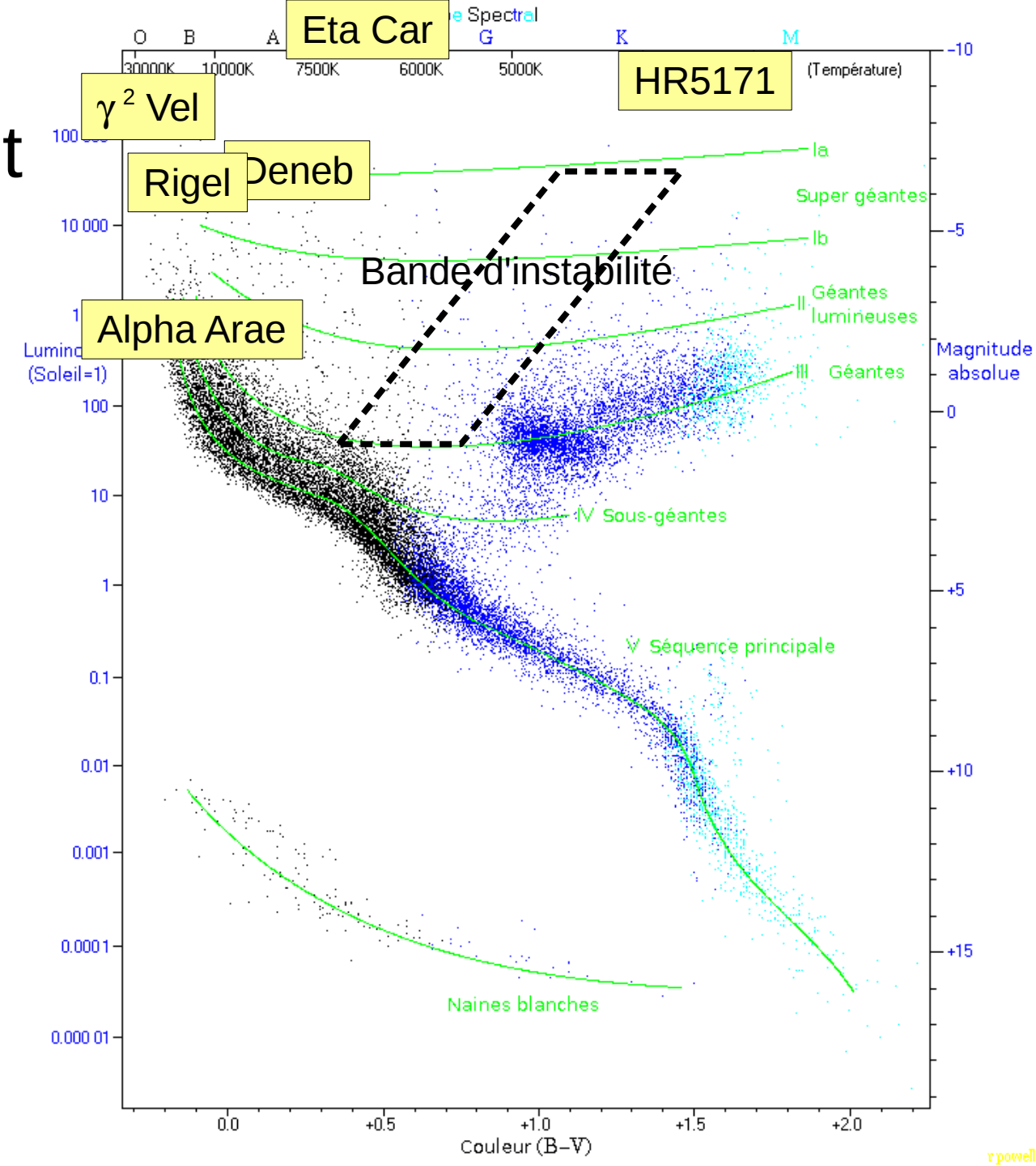
- Source d'ionisation / énergie cinétique du milieu interstellaire,
- Formation de la poussière en milieu hostile ?
- Progéniteurs de certaines supernovae ?
- mécanismes de perte de masse ?
- Binarité ?

.



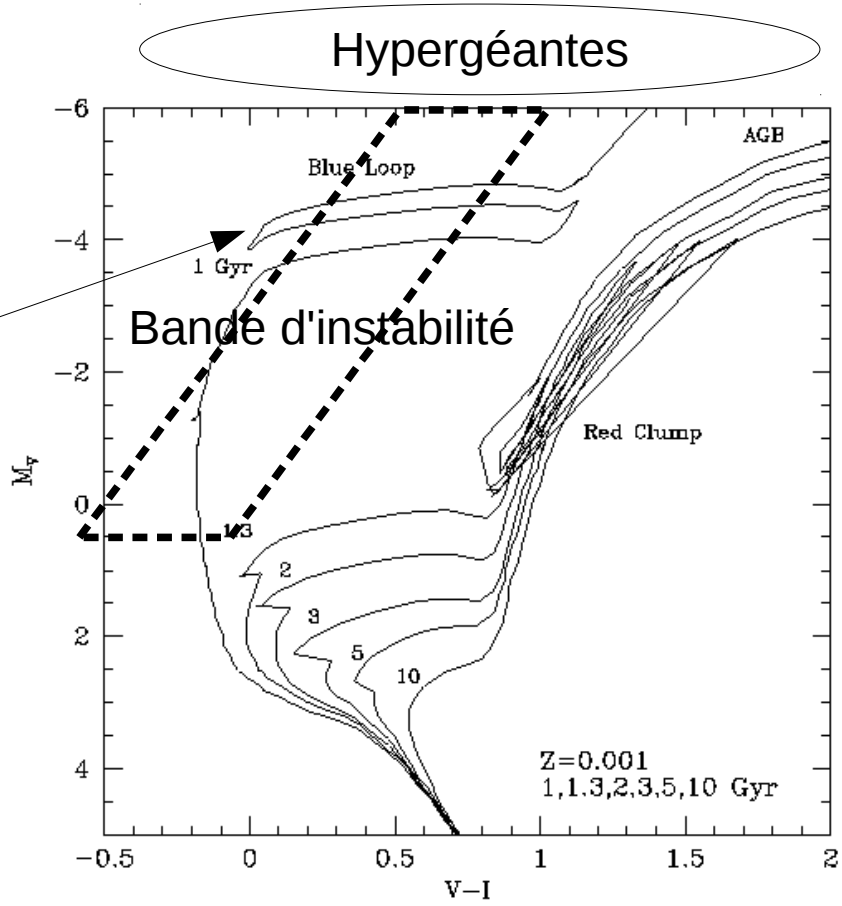
O. Chesneau et les étoiles massives

- WR
- LBV
- Be
- B[e]
- B, O



Qu'est-ce qu'une hypergéante jaune ?

- ~1000 fois le rayon du soleil
- Entre hypergéantes rouges et bleues
  - Évolution dans la “Boucle bleue” (Blue loop)
- Étoile “qui ne doit pas exister”
  - Luminosité trop forte par rapport à sa force de gravité
  - Proximité de la “bande d'instabilité” → objet instable
  - Évolution décelable sur ~100 ans
- Très peu d'étoiles (~10)
- Très peu d'études de leur environnement proche



Chemins d'évolution pour différentes masses initiales des d'étoile

Qu'est-ce qu'une hypergéante jaune ?

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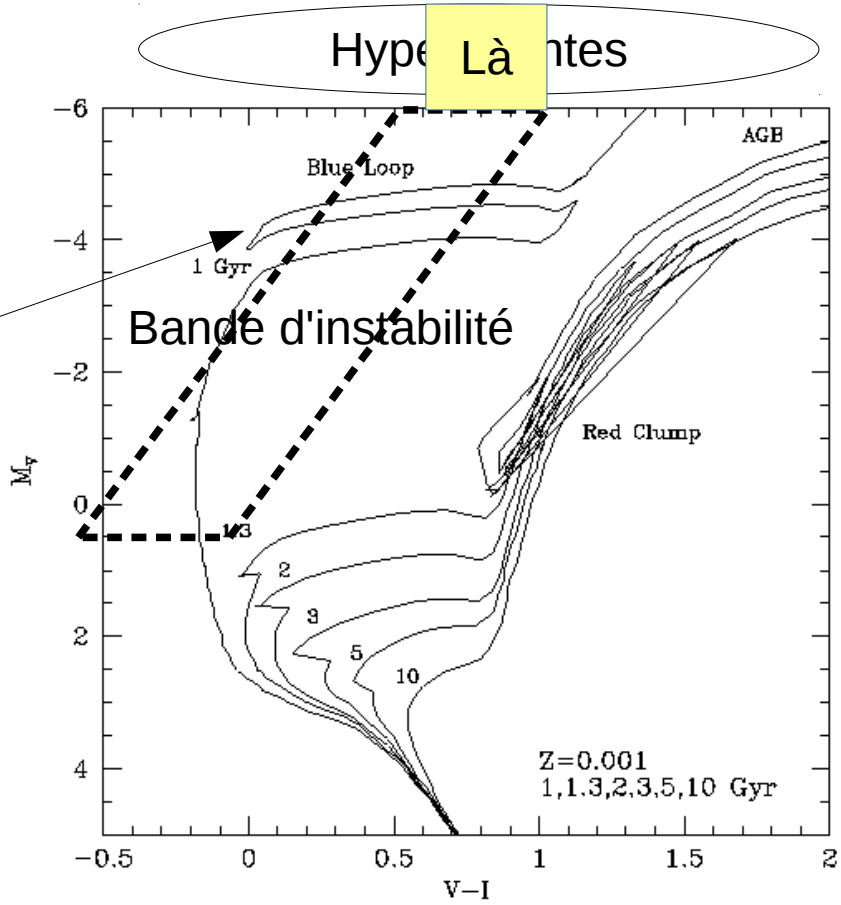
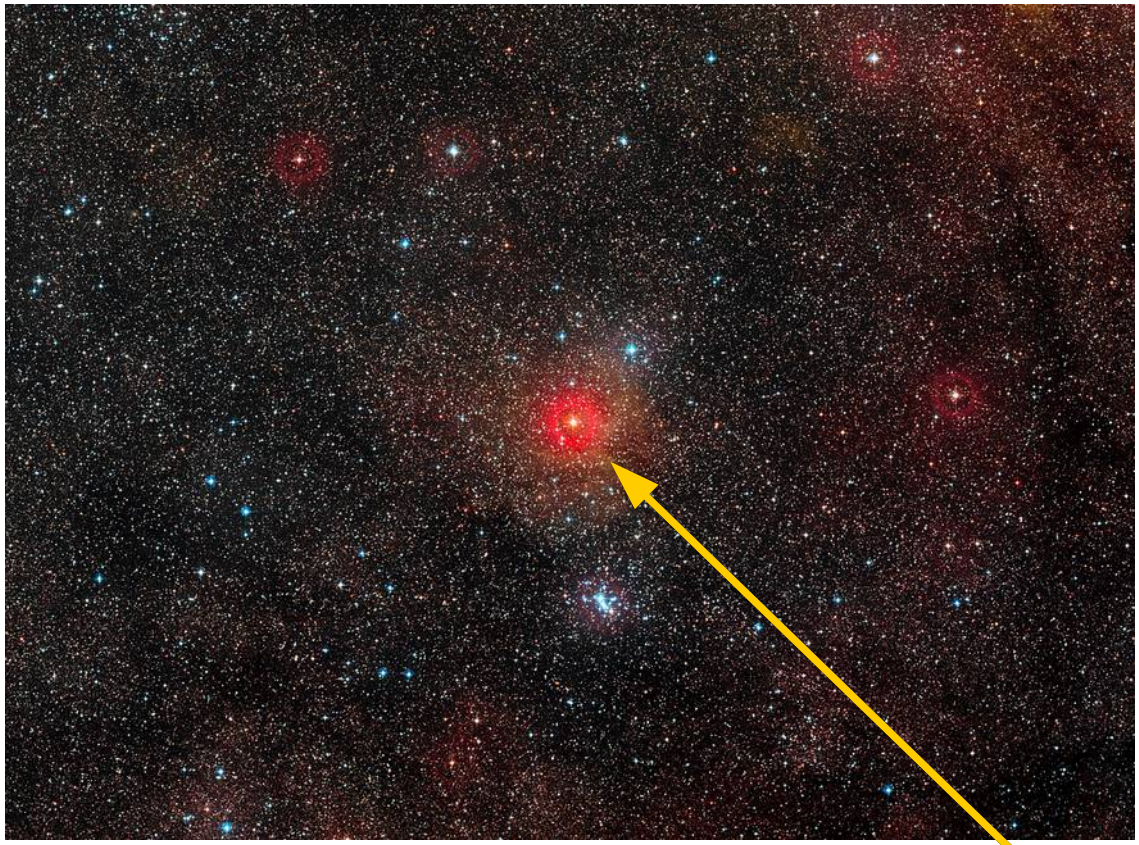


Chemins d'évolution pour différentes masses initiales des d'étoile

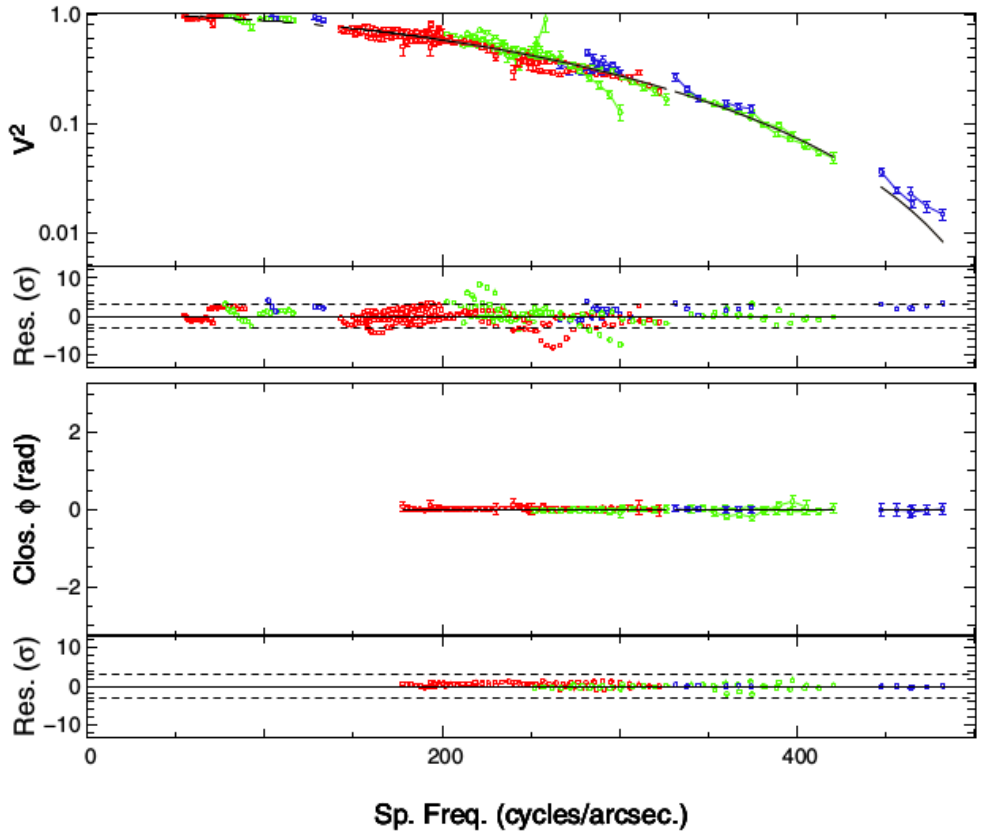
HR5171



C'est celle-ci !

Chesneau et al. 2014

HR5171 – Interférométrie



Étoile-témoin : V382 Car

Chesneau et al. 2014

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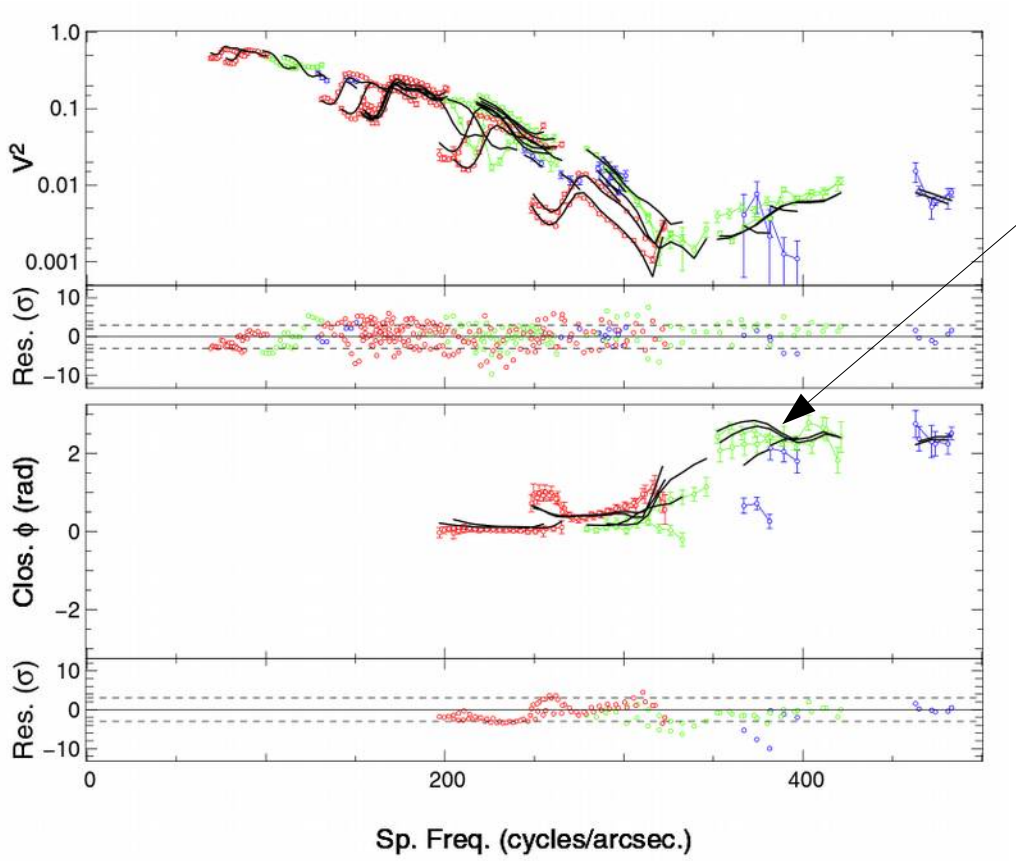
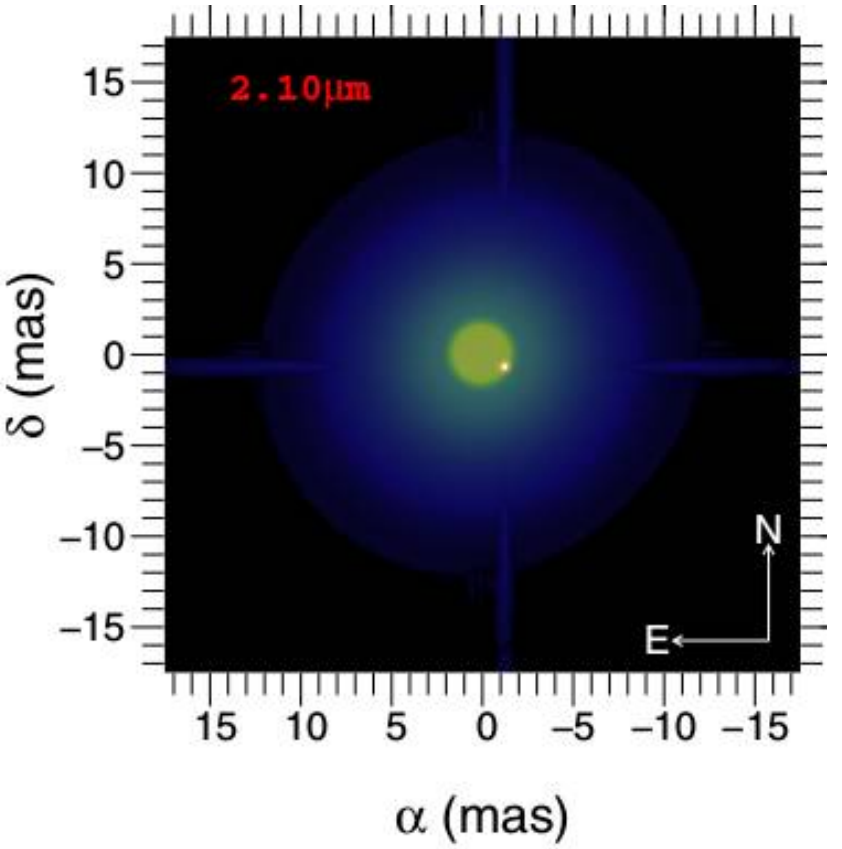


Signature d'un compagnon stellaire !

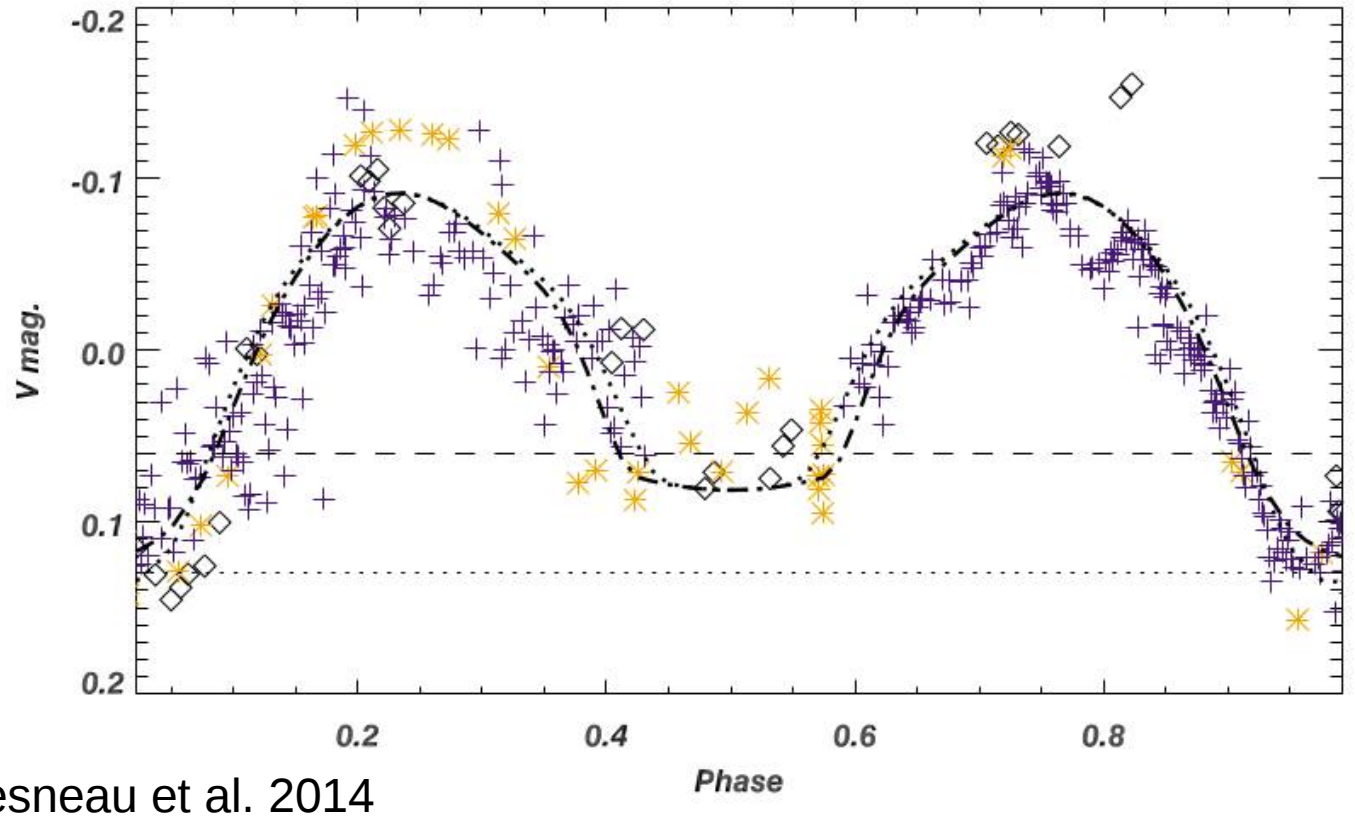


Chesneau et al. 2014

HR5171 – Photométrie

Courbe de lumière périodique = étoile binaire

Variation séculaire + variation périodique



Chesneau et al. 2014

HR5171 : l'article scientifique

- 2 années de dur labeur et d'échanges intenses !
- Plein de techniques différentes : interférométrie, photométrie, optique adaptative, spectroscopie, rayons X
- Olivier a fait appel à de nombreuses spécialités et a magistralement orchestré le travail (comme à chaque fois !)
  - Interférométrie: F. Millour, A. Meilland, A. Spang, N. Nardetto, …
    + O. Chesneau bien entendu !
  - Optique Adaptative: N. Smith, ...
  - Spectroscopie: J. Groh, M. Curé, S. Kanaan, J. Smoker, ...
  - Photométrie: E. Chapellier, A. van Genderen, P. Whitelock, M. Feast, L. Vanzi, ...
  - Rayons X: Y. Nazé, ...
  - Modèles: L. Dessart, ...
  - Traitement du signal: P. Bendjoya, …

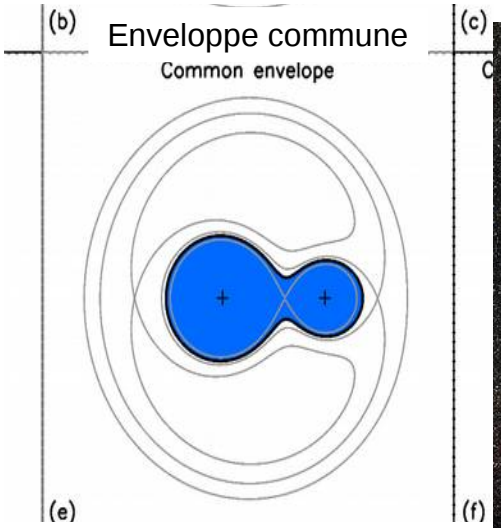
Chesneau et al. 2014

HR5171

Quelques exemples d'échanges avec Olivier Chesneau ses maîtres mots : humour, humilité, humanisme !

- À propos des données : “Voilà le TRESOR, Attention, ne touche pas à mon PRECIEEUX, Golum”
- “Florentin [...] 'sees' binaries everywhere...”
  Florentin […] `voit' des binaires partout...
- “The binary hypothesis cannot be neglected for this star, but will be also hard to prove/demonstrate.”
  L'hypothèse d'une étoile binaire ne peut pas être negligée, mais sera difficile à prouver/démontrer
- À A. van Genderen : “I have to learn, and to train myself. I realize that it is not an easy task at all!!!”
  Je dois apprendre et m'entraîner. Je réalise que ce n'est pas du tout une tâche facile !!!
- À Y. Nazé: “...un GRAND merci pour ton aide qui nous à permis d'exploiter une 'piste' comme les policiers de la brigade criminelle.”
- “Explaining all the developments of the HR 5171 A project would be a (too) long (and wonderful!) story to tell.”
  Vous expliquer tous les développements du projet sur HR5171 A serait une (trop) longue (et magnifique) histoire à raconter

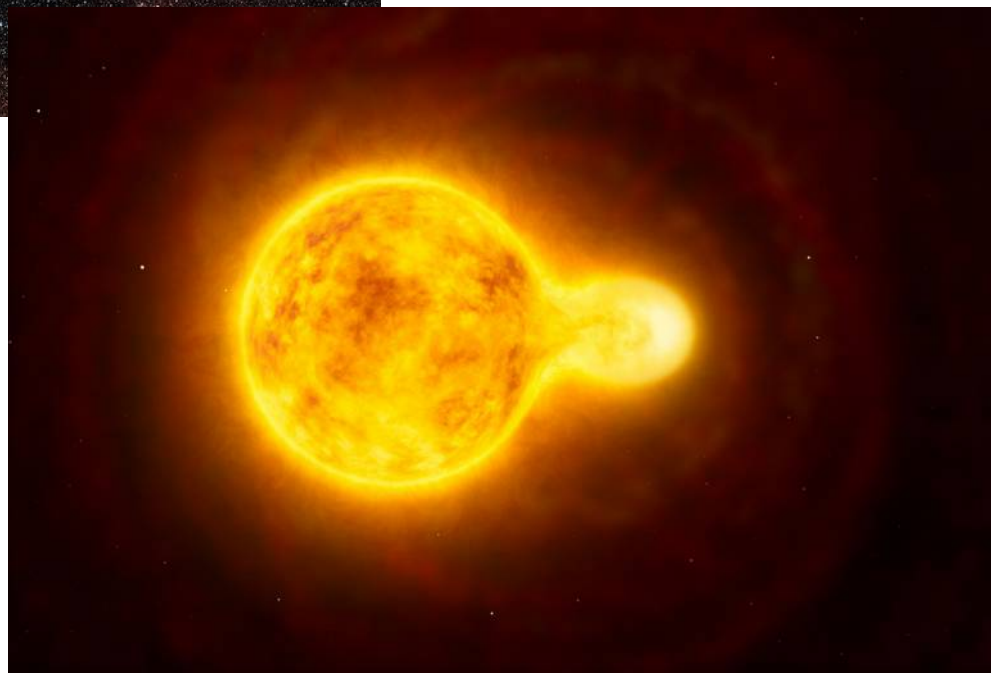
HR5171



(Meilland 2015)

Olivier était très content de ce travail, c'est probablement celui pour lequel il a eu le plus d'échanges avec d'autres astrophysiciens !

L'étoile cacahuète !

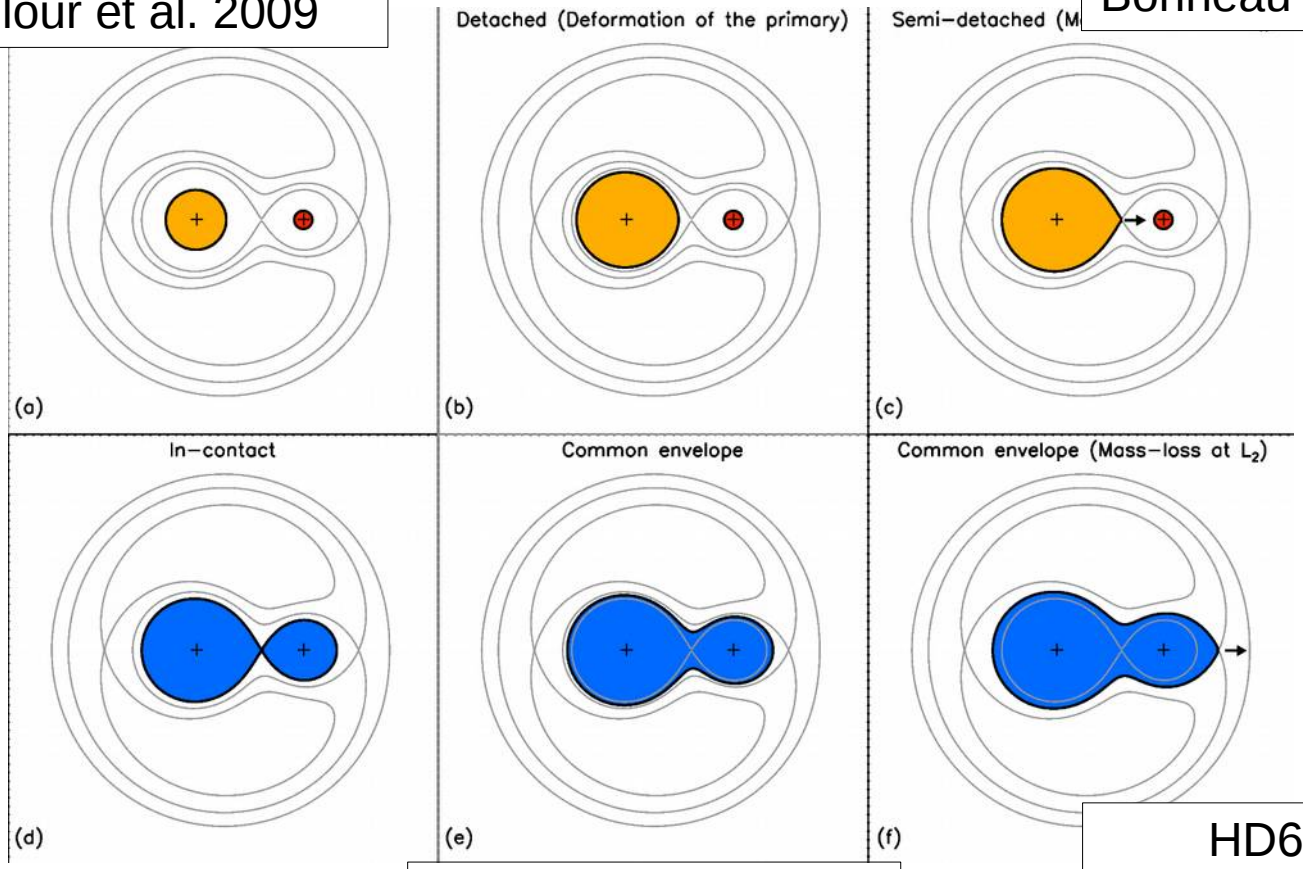


Chesneau et al. 2014

Sa contribution à l'étude d'autres binaires massives en interaction

Gamma Vel: Millour et al. 2007
Eta Car: Chesneau et al. 2005
HD87643: Millour et al. 2009

Beta Lyr, Nu Sgr
Netolicky et al. 2009
Bonneau et al. 2011



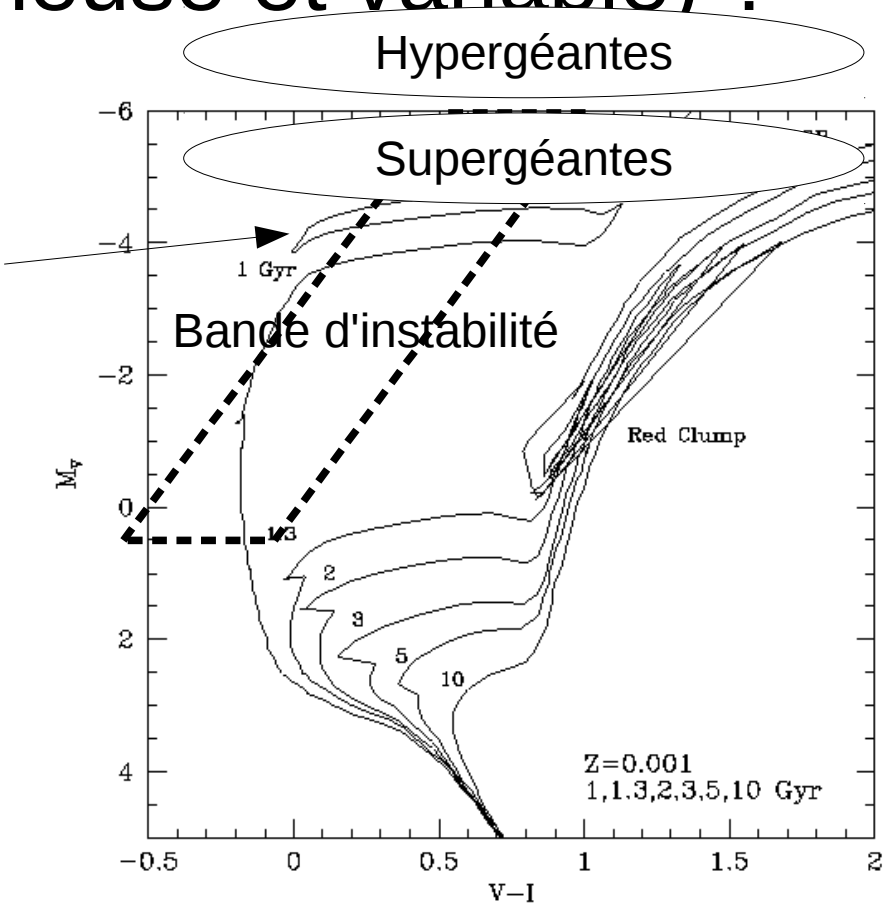
HR5171:
Chesneau et al. 2011

HD62623
Meilland et al. 2010
Millour et al. 2011

Meilland 2015

Qu'est-ce qu'une LBV (Étoile Bleue lumineuse et variable) ?

- Étoiles bleues supergéantes
- Perte de masse constante et importante
- Éruptions géantes (plusieurs masses solaires)
- Très peu d'étoiles (~10)
- Très peu d'études de leur environnement proche



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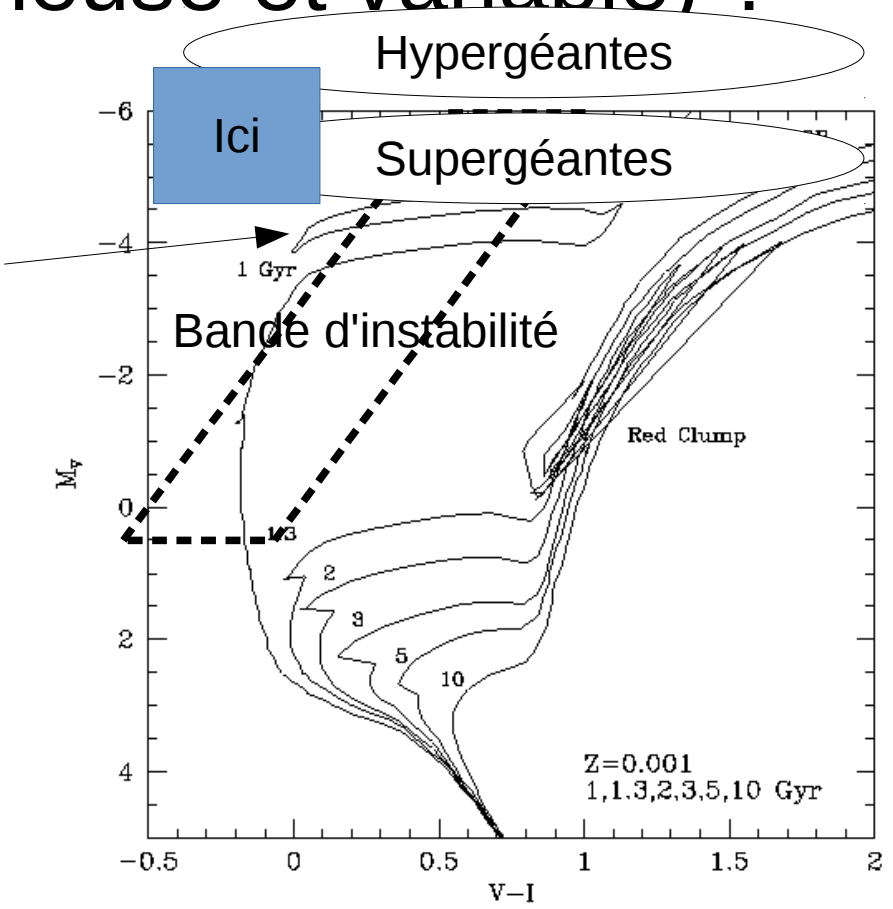

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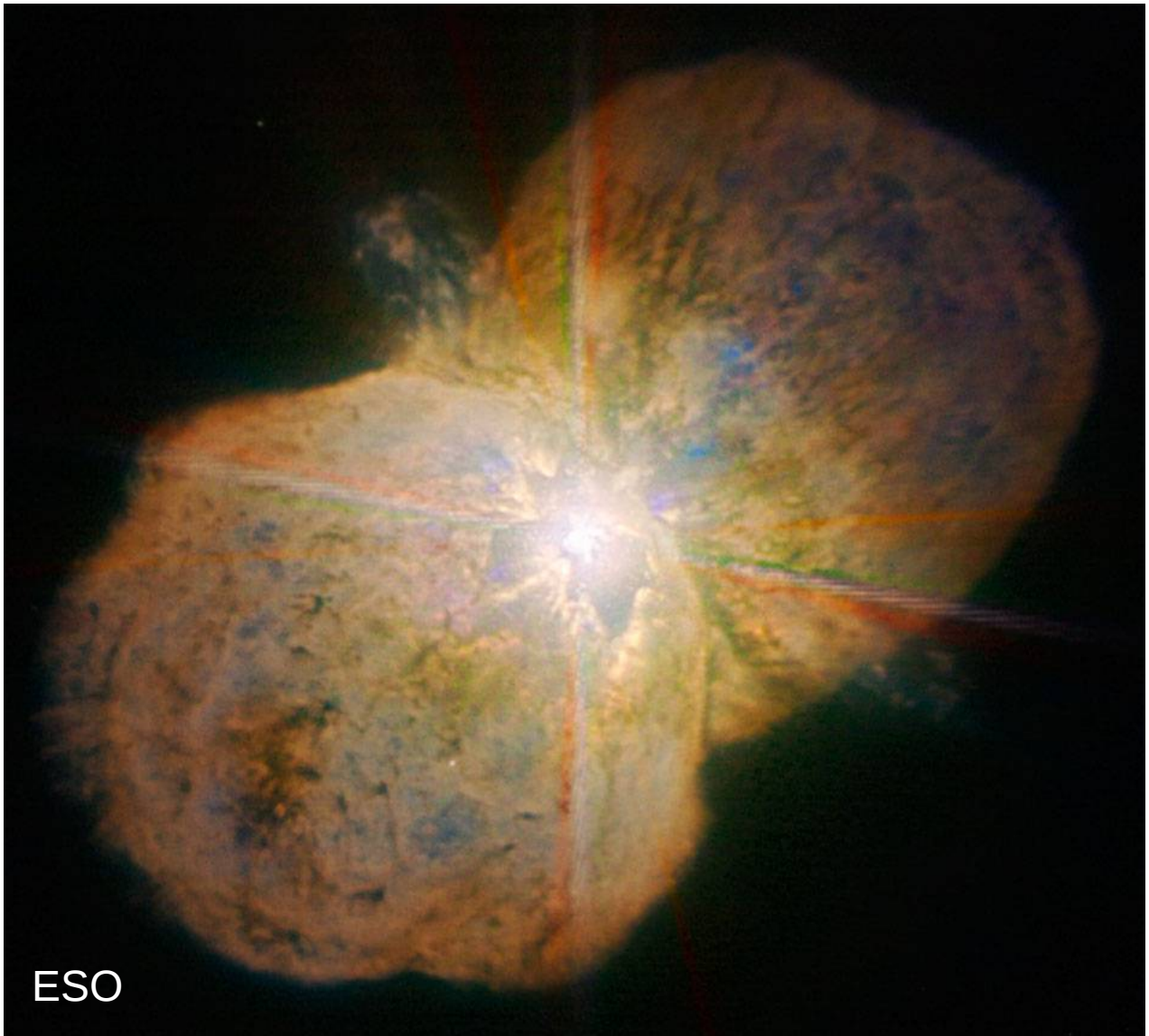
Un monstre dans notre Galaxie : Eta Carinae



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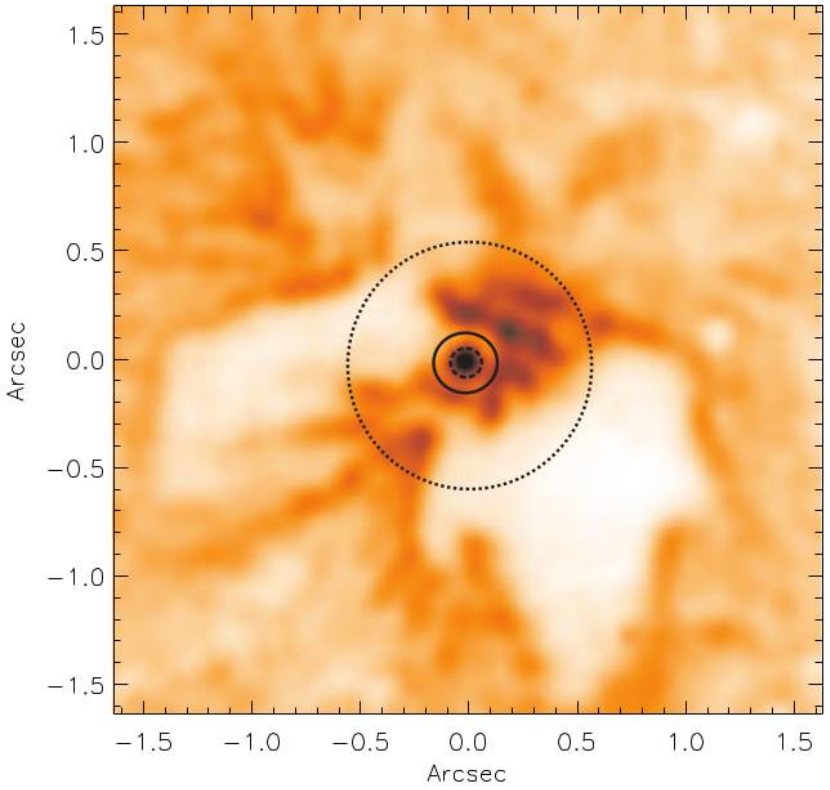
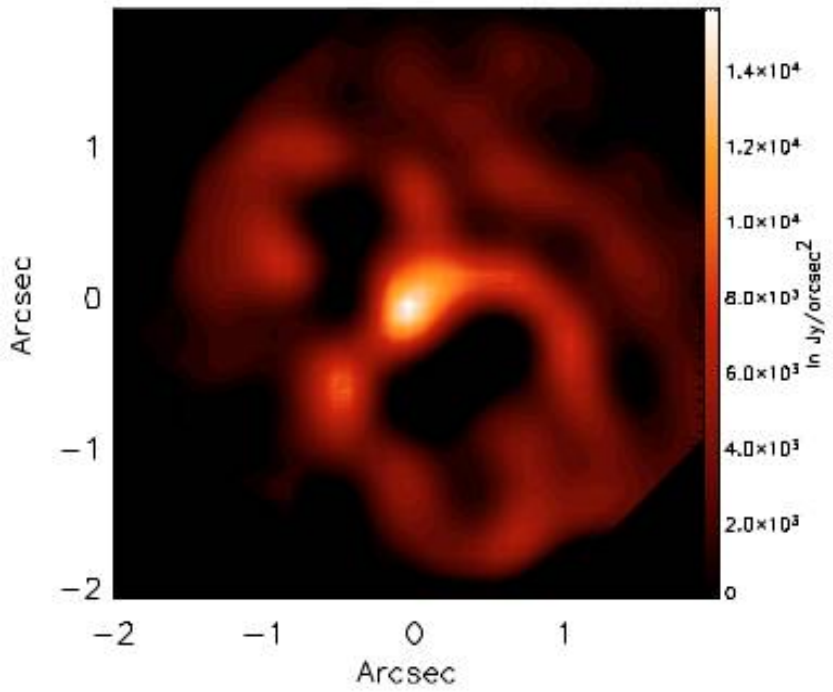
Infrarouge proche (2μm)



Infrarouge thermique (10μm)



L'image infrarouge ne correspond pas à celle dans le visible obtenue bien avant.
Beaucoup de structures dans la nébuleuse : arcs, filaments, etc.
Olivier était mitigé sur le résultat de ce travail : objet trop compliqué !

Chesneau et al. 2005

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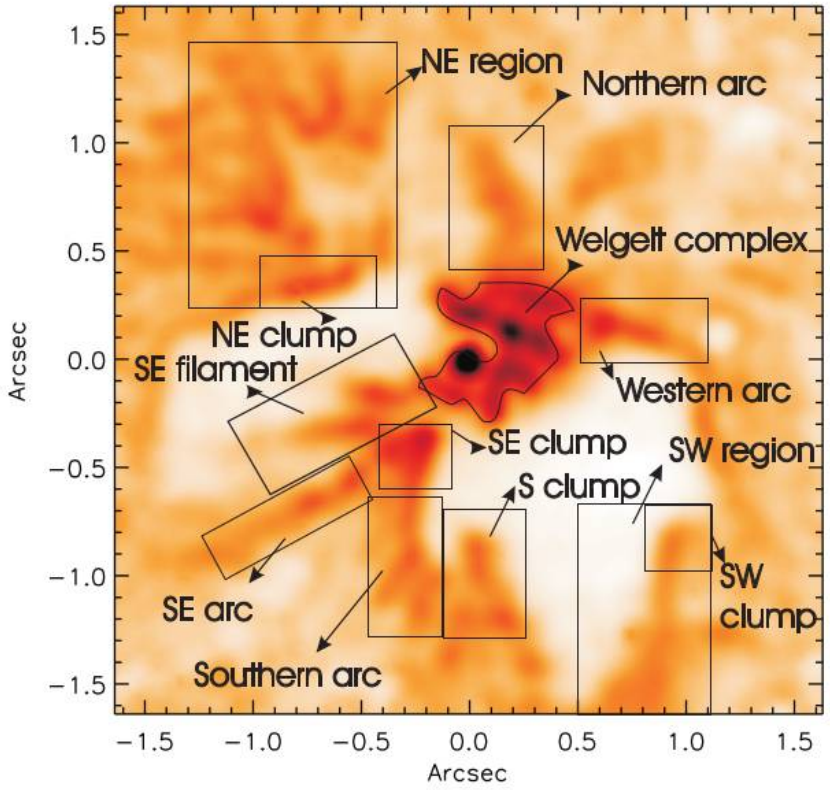

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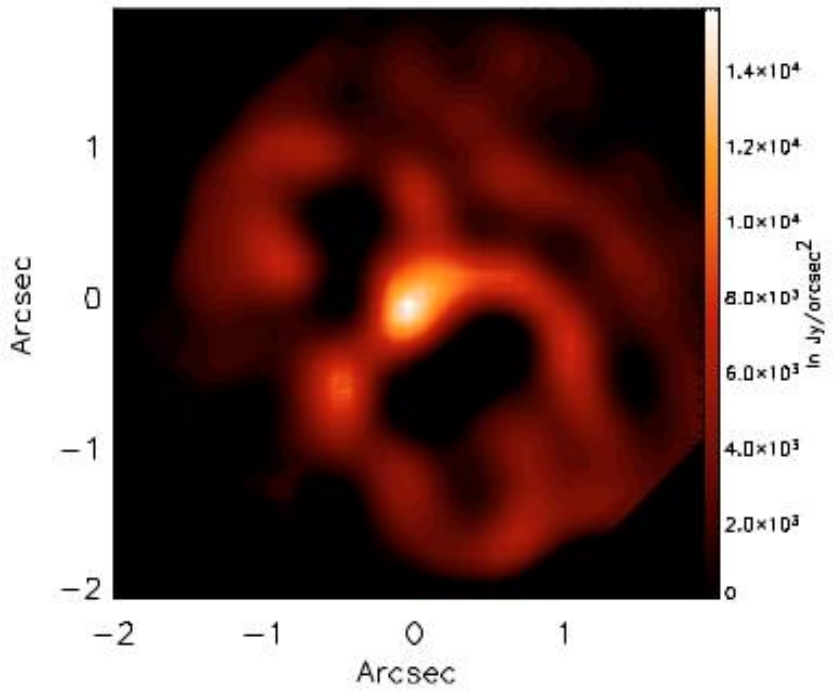

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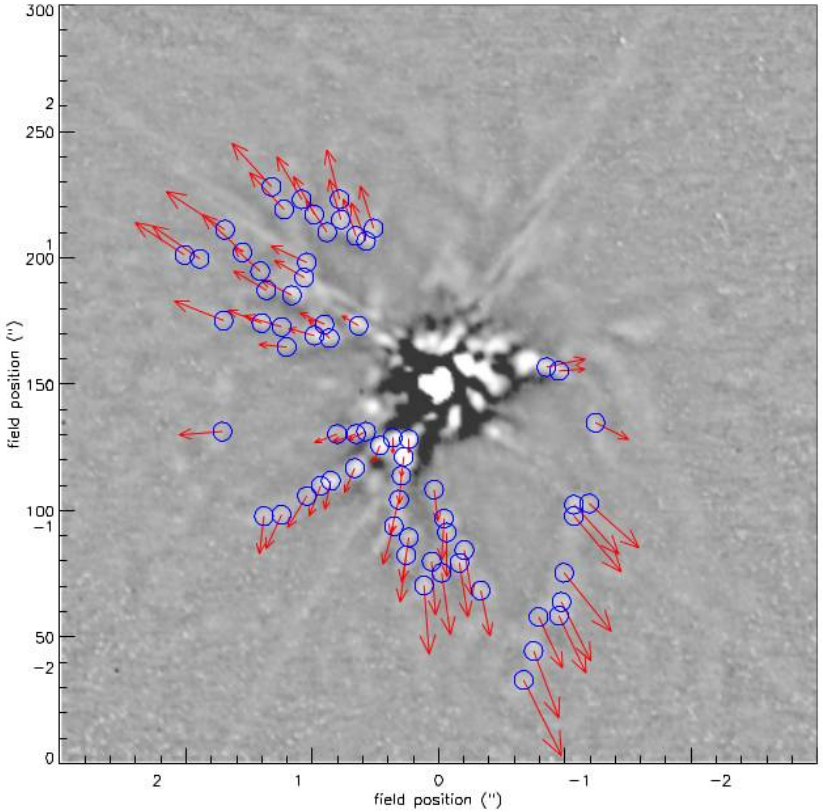
Le travail d'Olivier a inspiré d'autres chercheurs ...



On a pu “voir” l'expansion de la nébuleuse de l'homunculus grâce aux travaux d'Olivier

Artigau et al. 2011

Gamma Velorum

- Premières observations AMBER, & mon premier contact professionnel avec Olivier fin 2004 :

"Great!!!!!!!!!!!!
Congratulation to all of you, I know how these observations can be stressful and exhausting.
I wish to the observer and the AMBER team other sucessfull nights and a rich scientific harvest for AMBER.
Good luck for the end of the run,
Olivier"

"Bravo!!!!!!!!!!!!
Félicitations à vous tous, je sais comment ces observations peuvent être stressantes et fatiguantes.
Je souhaite aux observateurs et à l'équipe AMBER d'autres nuits de succès et une moisson scientifique riche pour AMBER.
Bonne chance pour la fin des observation,
Olivier

- Un travail très formateur grâce à Olivier
  - Apprentissage de l'astrophysique des vents
  - Découverte de la complexité d'interprétation des données AMBER

"Il est pour l'instant extrêmement difficile d'obtenir de manière artisanale le fit de la position de la binaire sur le ciel (deux paramètres, écartement rho et angle).
Je pense que cela va être un gros travail qui nécessite du temps et de la méthode. De plus je ne suis pas un pro de l'inversion de données..."

  - Mon premier papier !! (Millour et al. 2007)

La suite...

The γ^2 Velorum binary system

F. Millour[a], A. Lamberts[b], O. Chesneau[a,*]

[a]Lagrange laboratory, Observatoire de la côte d'Azur, Nice, France
[b]Departement of physics, University of Wisconsin Milwaukee, Milwaukee, USA
*O. Chesneau passed away before seeing the results of this work that he initiated.

Previous works

Millour et al. 2007 (PaperI):

We investigated spectro-interferometric AMBER observations made in 2004, and found out that the Hipparcos distance was underestimated by ~30%, in addition to refining the spectral types and detecting an additional flux component to the system. At that time, we could only elaborate on the source of this additional flux.

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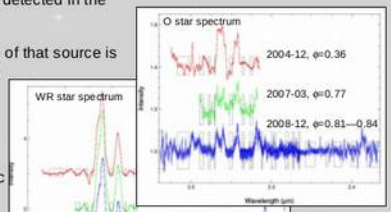

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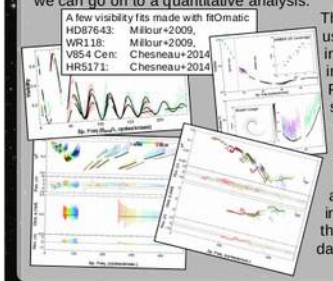

This step will be done using the fitOmatic tool, initially developed to interpret the data of PaperI and later used in several AMBER & MIDI papers involving chromatic datasets.

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General description:

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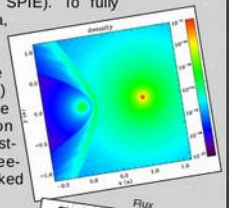

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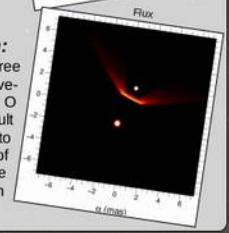

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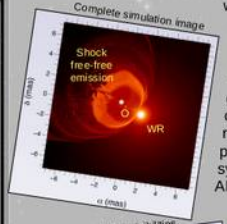

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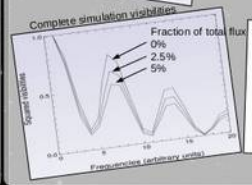

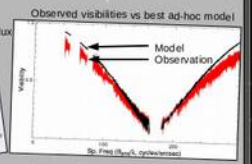

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AMBER can resolve the shock region in WR binary stars

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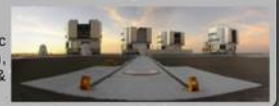

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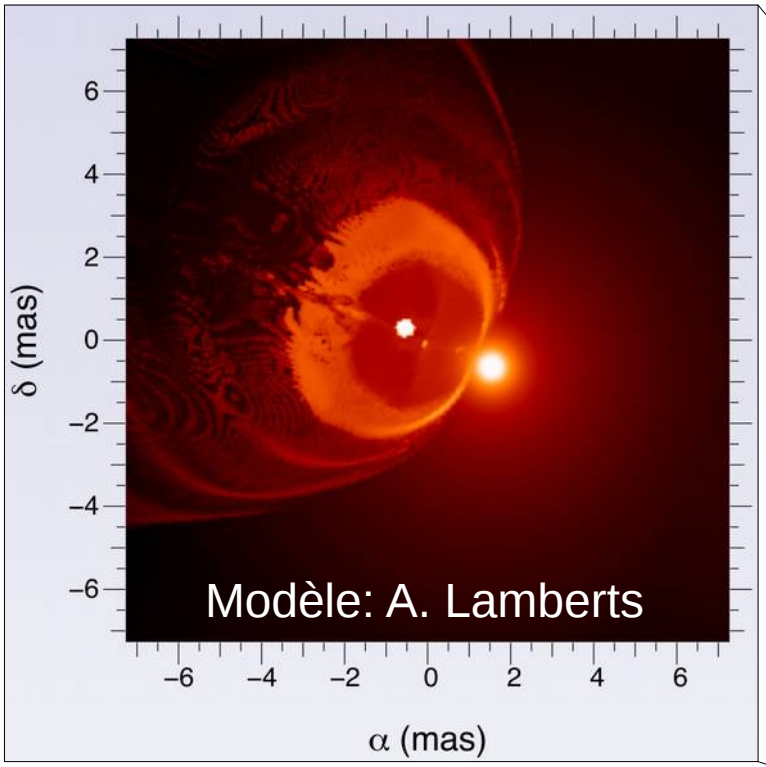

Olivier en 2005 :
“Pour le free-free, j'ai cherché, cherché. […] je me rends compte que cela ne dois pas être négligeable.
[…] L'emission free-free […] est variable dans le temps car elle dépend de la densité du choc, qui varie avec l'orbite
[…]
la géométrie est complexe,
[…]
C'est au-delà de mes compétence (calculs de processus de refroidissement, du rayonnement...).”

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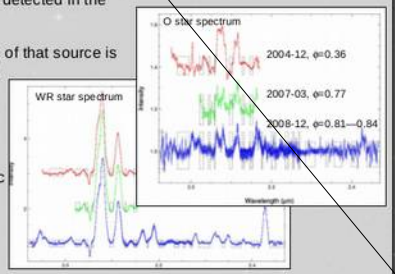

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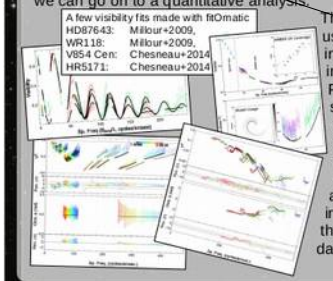

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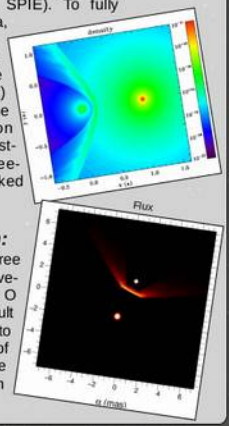

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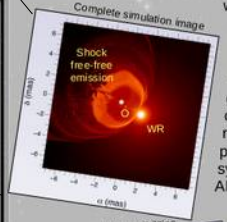

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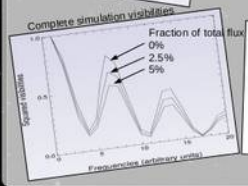

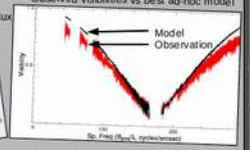

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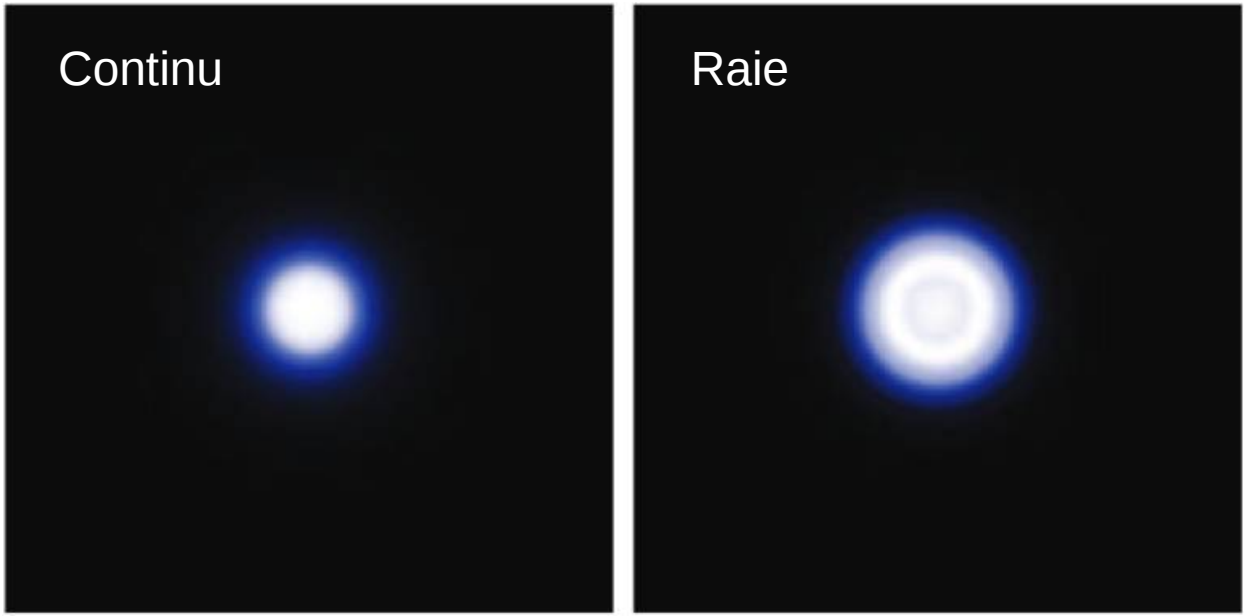
Le travail sur les vents stellaires...

- Étoiles de la séquence principale
  - Deneb, Rigel
- Autres étoiles chaudes
  - Wolf-Rayet, LBV: Gamma Vel, P Cyg, etc.

Modèle de vent stellaire autour d'une étoile chaude



Le vent radiatif des étoiles chaudes

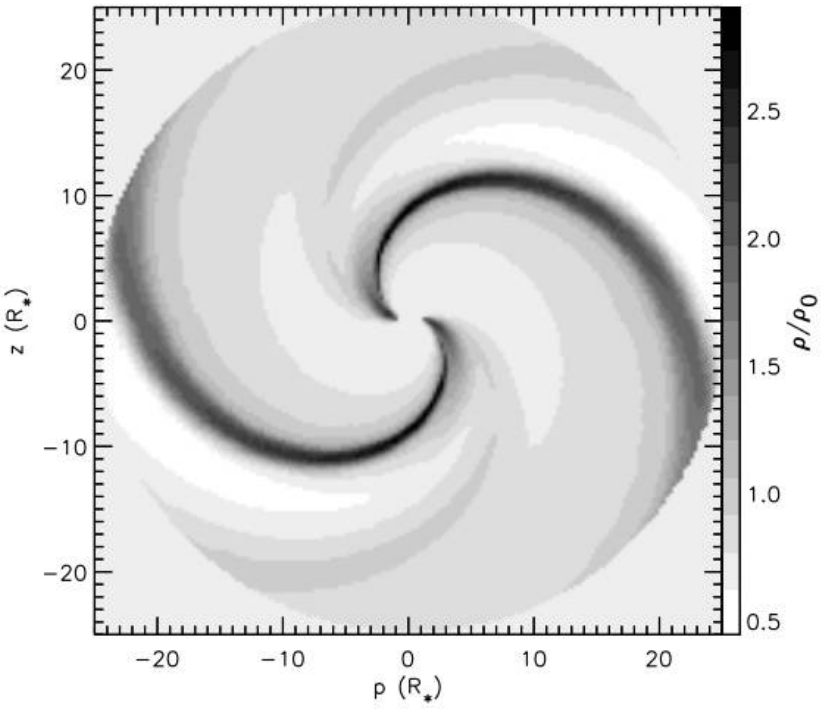
Modèle de vent stellaire autour de Deneb

Modèle de vent stellaire autour d'une étoile chaude

- “vent” de particules qui est poussé vers l'extérieur par la pression de radiation (interaction photons/matière)
- Pas d'équilibre thermodynamique, mais physique de formation des raies assez bien comprise (modèle CMFGEN de Luc Dessart)
- Variabilité du vent mal comprise
- Loi d'accélération du vent mal contrainte

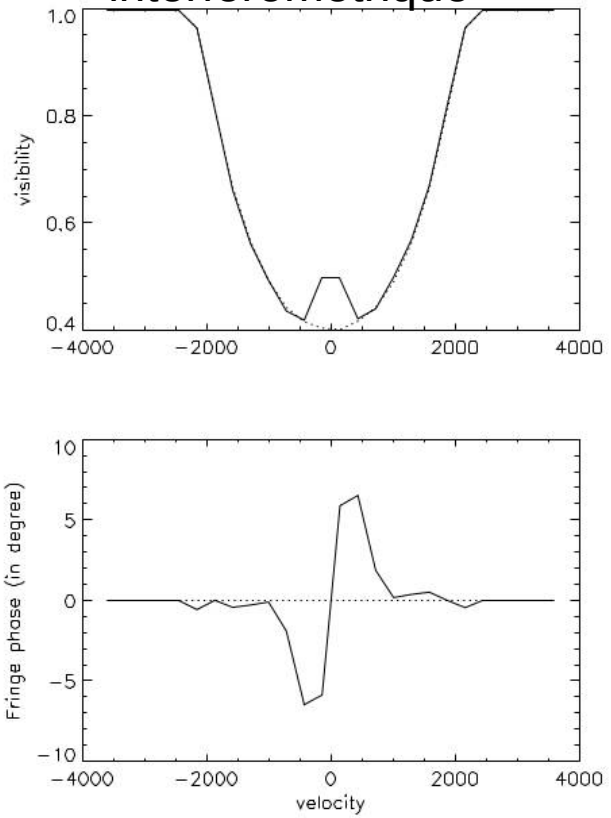
Les vents stellaires... Un travail théorique

CIR: zones d'interaction
du vent en co-rotation avec l'étoile



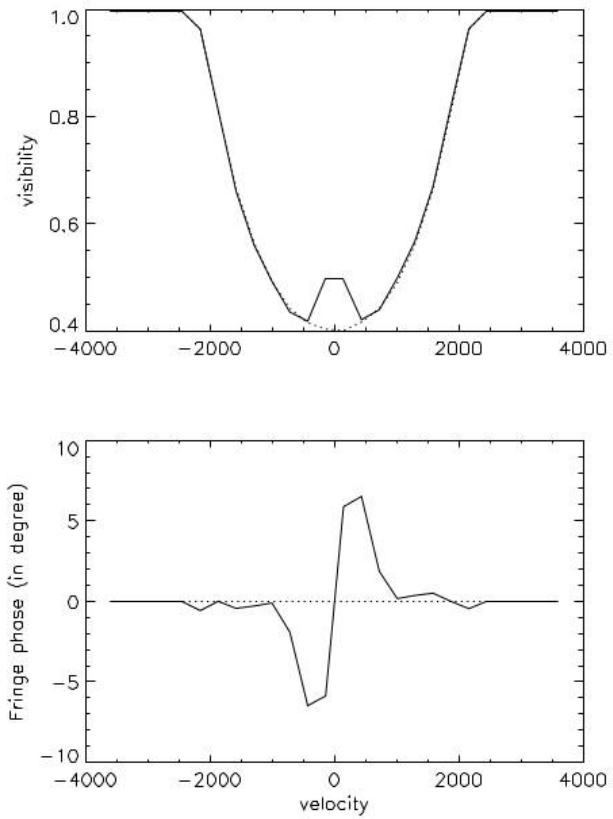
Dessart & Chesneau 2002

Prédictions du signal
interférométrique



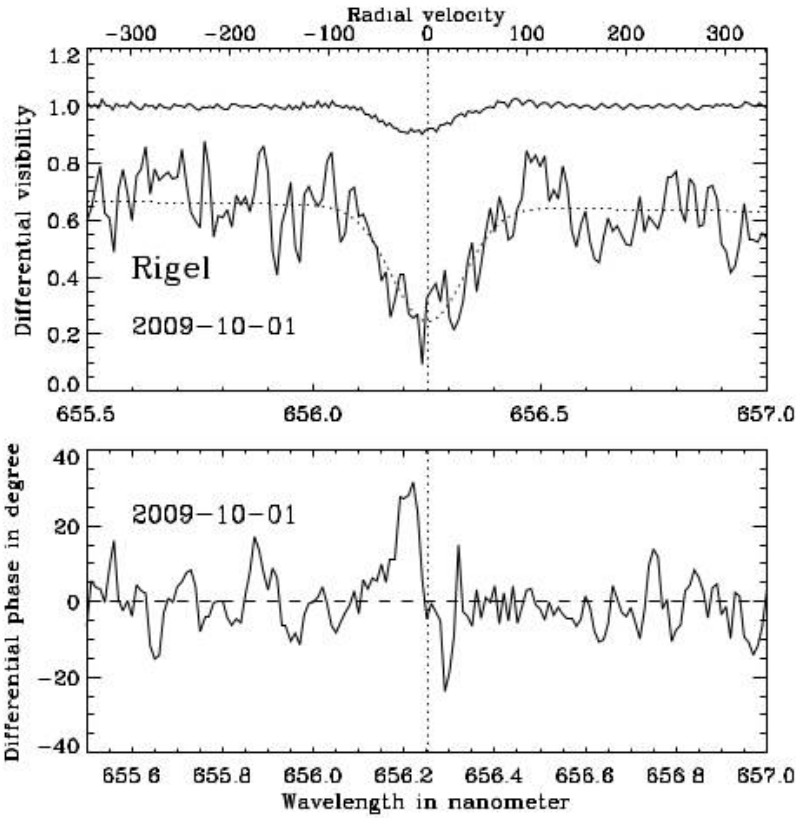
Les vents stellaires... Suivi d'un travail pratique

Modèle théorique



Dessart & Chesneau 2002

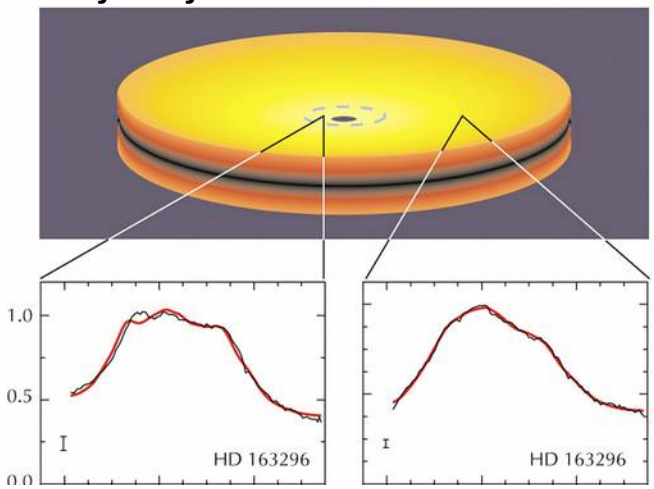
Observations avec VEGA/CHARA



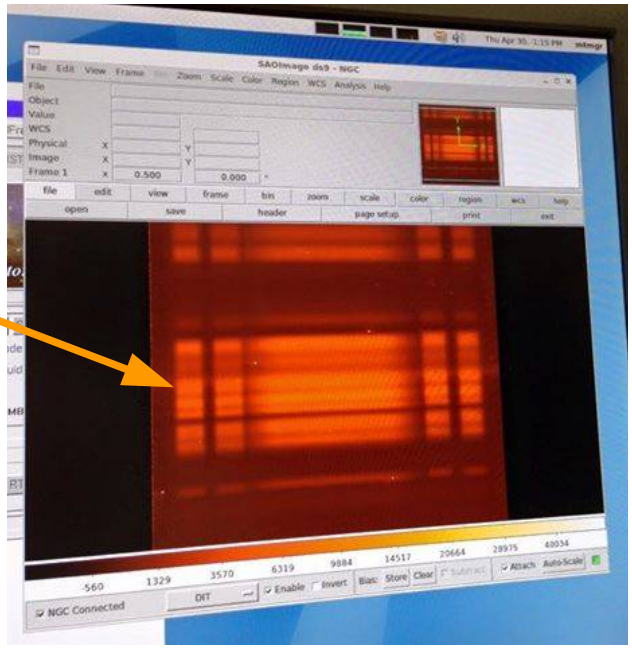
Chesneau et al. 2010

Les autres contributions d'Olivier Chesneau

Objets jeunes: van Boekel et al. 2004, Kraus et al. 2008, etc.

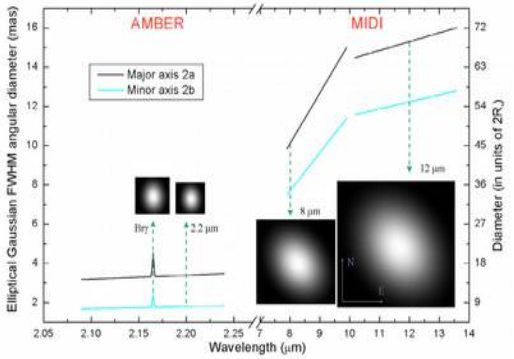


Projets:
MATISSE
"Calibration Chesneau" dans MATISSE

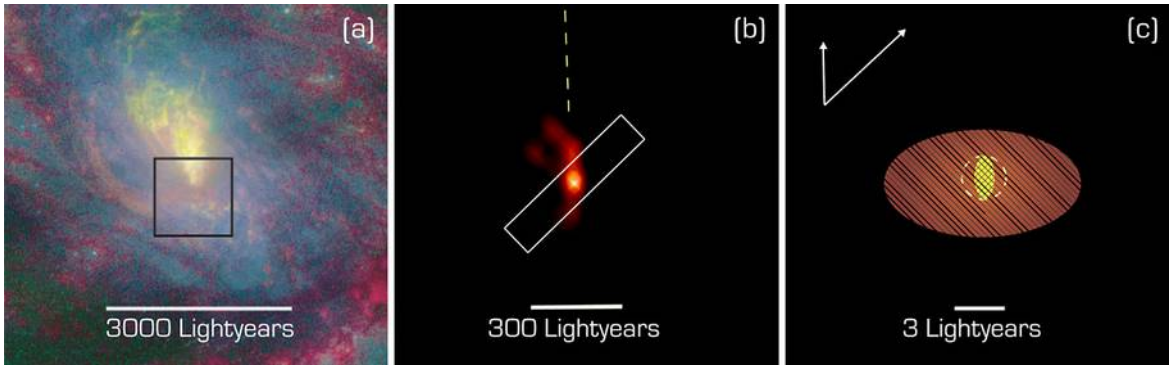


SPHERE
JMMC
ASHRA
EII

Supergéantes B[e]:
Chesneau et al. 2003, Domiciano et al. 2007, Millour et al. 2009, Millour et al. 2011, Borges et al. 2011, Cidale et al. 2012, etc.



Noyaux actifs de galaxies : NGC 1068 Jaffe et al. 2004



Ses maîtres mots : humour, humilité, humanisme !

“A vous les studios,

A bon entendeur,

Salut,

Olivier”

Le 9/11/2005

Hands back to the studio,
a word to the wise is enough,
Olivier