

LITpro : état actuel et feuille de route

Isa & Michel

(en vert, remarques ajoutées en séance)

cf présentation atelier VEGA 2017 (*JMMC-PRE-2300-0012.pdf*)

LITpro proposes to the user

- one local fitter (Levenberg Marquardt with trust regions and bounds on the parameters)
up-to-now the most efficient for seeking local minima
- search of global minimum by gridding parameters
"Plot chi2 with fit"
"sniffer_map" (deprecated)
- one estimation of the error bars (from χ^2 curvature)
- a library of combinable object models
easy to expand

Search of global minimum by gridding parameters

Plot model panel

☐ Residuals
 ☒ Overplot model with cut angle

Cuts in the chi2 space panel

☐ 1D

☒ log
 ☒ reduced
 ☐ with fit
 ☒ 2D

améliorer GUI :

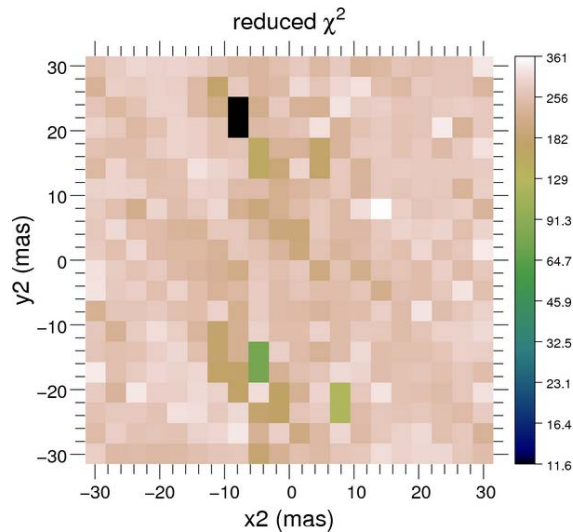
enlever sniffer_map

étoffer (clarifier) Plot Chi2

Search of global minimum by gridding parameters

ex: binary of the 2004 Interferometric Imaging Beauty Contest

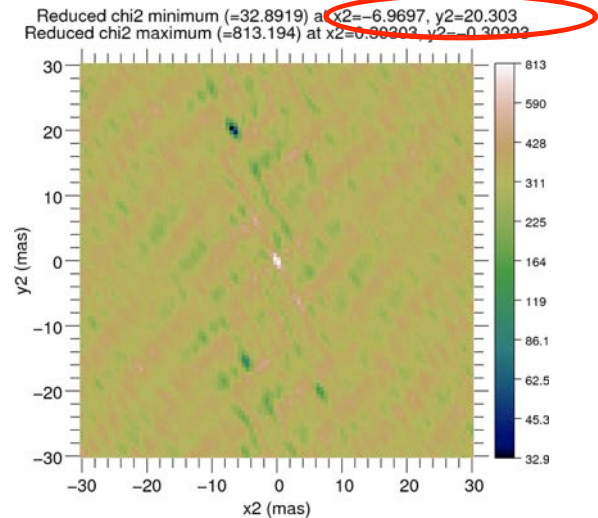
Plot Chi2 for x2,y2 with fit of the flux_weights



n REDUCED CHI2 MINIMA:

chi2 @ x2, y2 | flux_weight1 flux_weight2
coordinates | fitted parameters

Plot sniffer map for x2,y2 :



n REDUCED CHI2 MINIMA:

chi2 @ x2, y2

n fixed by default in the GUI (up-to-now)

==> "Plot sniffer map" will disappear from the GUI

lpb_punct()	- Single point (Dirac function)
lpb_background()	- Background
lpb_disk()	- Uniform disk with normalized total flux
lpb_disk_polar()	- Uniform disk with normalized total flux
lpb_nonorm_disk()	- Not normalized uniform disk
lpb_circle()	- Circle
lpb_gaussian()	- Gaussian
lpb_ring()	- Uniform ring
lpb_gaussian_ring()	- Gaussian ring
lpb_square()	- Uniform square
lpb_modulated_circle()	- Gaussian ring
lpb_elong_disk()	- Ellipse (elongated disk)
lpb_nonorm_elong_disk()	- Not normalized ellipse (elongated disk)
lpb_elong_gaussian()	- Elongated Gaussian
lpb_elong_ring()	- Elongated ring
lpb_elong_limb_power()	- Ellipse (elongated disk)
lpb_flatten_disk()	- Ellipse (flattened disk)
lpb_nonorm_flatten_disk()	- Not normalized Ellipse (flattened disk)
lpb_flatten_gaussian()	- Flattened Gaussian
lpb_flatten_ring()	- Flattened ring
lpb_stretched_disk()	- Stretched Gaussian
lpb_stretched_gaussian()	- Stretched Gaussian
lpb_stretched_gaussian_ring()	- Stretched Gaussian Ring
lpb_stretched_modulated_circle()	- Stretched modulated circle
lpb_stretched_modulated_gaussian_ring()	- Stretched modulated gaussian ring
lpb_limb_power()	- Limb-darkened disk with power law
lpb_limb_linear()	- Limb-darkened disk with linear law
lpb_limb_quadratic()	- Limb-darkened disk with quadratic law
lpb_limb_sqrt()	- Limb-darkened disk with square root law
lpb_limb_nonlinear_Claret()	- Limb-darkened disk with the new non-linear law of Claret (2000)
lpb_blackbody()	- Weight with relative flux of black-body
lpb_background_BB()	- Background with black-body emission
lpb_punct_BB()	- Single point (Dirac function) with black body emission
lpb_disk_BB()	- Uniform disk with black body emission
lpb_elong_disk_BB()	- Elongated disk with black body emission
lpb_stretched_disk_BB()	- Stretched disk with black body emission
lpb_gaussian_BB()	- Uniform disk with black body emission
lpb_stretched_gaussian_BB()	- Stretched Gaussian with blackbody

present model functions : a lot !

Par ordre chronologique : du plus court au plus long terme

- Fitters locaux
- Fitters globaux
- User functions
- OIFITS2
- Effets instrumentaux
- Format → OImaging
- Barres d'erreur

Actuellement :

Levenberg Marquardt with trust regions and bounds on the parameters

Besoin de fitters plus efficaces

A tester :

Neadler-Mead

NLFIT

BOBYQA (Powell)

Interface faite

A faire : benchmark

- Fitters locaux
- **Fitters globaux**
- User functions
- OIFITS2
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Actuellement :

"Plot chi2 with fit" (chi2_explore) gridding parameters

En cours :

algo. génétique (Hervé) - à implanter dans GUI -
projet "gutsyfit" (Michel)

Interface faite

A faire : benchmark

- Fitters locaux
- Fitters globaux
- **User functions**
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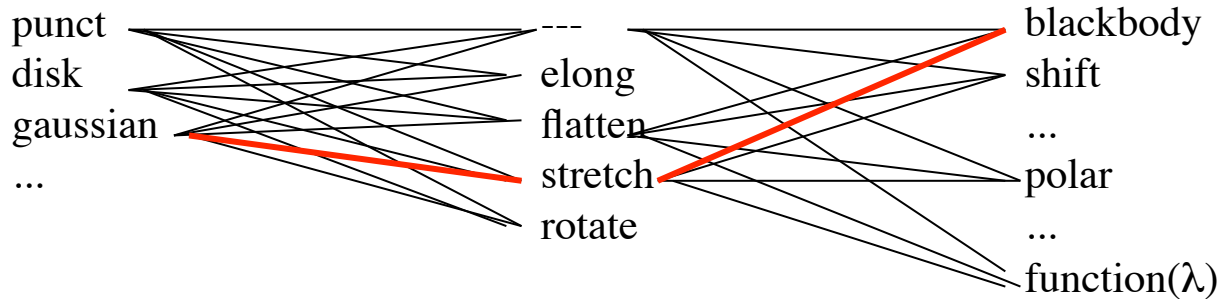
- to replace the present functions by an algebra combining
 - a set of basic model functions
 - with
 - a set of operators (transforms & filters)

basic functions

transforms

operators

filters



ex: `lpb_stretched_gaussian_BB()`

--> the user may compose any model easily
and also write its own function

func *UserFunc* (coordinates, parameters)

coordinates = ufreq, vfreq, wavelength, bandwidth, MJD,...

parameters = x, y, flux_weight, diameter, temperature,...

- coding under way
- ---> "new" GUI with new functionalities
- link with an interactive web page, where users:
 - build its own model
 - find help
 - see the codes of existing model functions
 - may contribute to the library (sharing his model, commenting others)



Delete selection

Attach/Detach frame

User Manual

arcturus_1.79mu_tutorial.xml

Settings tree

- Settings
 - Files
 - Targets
 - Target[alphaboo]
 - File[arcturus.1.79mu.oifits]
 - binary
 - Usercode
 - binary
 - Shared parameters[0]
 - Results
 - Plots

Target panel

Ident: alphaboo

Model list

binary

punct_BB
ring
stretched_disk
stretched_disk_BB
stretched_gaussian
stretched_gaussian_BB
binary
custom3

-

+

Refresh

Create user model...

☐ Polar☐ Stretched

Visit web repos...

Selected file list

☒ File[arcturus.1.79mu.oifits]

Parameters

Name	Type	Units	Value	MinValue	MaxValue	Scale	HasFixedValue
binary2.flux_weight2	flux_weight		1	0	0	1	☐
binary2.x2	x		0	0			☐
binary2.y2	y		0	0			☐
binary2.flux_ratio2	flux_ratio		0	0			☐
binary2.rho2	rho		0	0			☒
binary2.PA2	PA		0	0			☐

Fitter setup

☒ Normalize total flux Select data to fit: ☐ VISamp ☐ VISphi ☒ VIS2 ☐ T3amp ☐ T3phi

Plot model panel

Plot image ☐ xmin -30 ymin -30 xmax 30 ymax 30 pixscale 1

Plot UV Map ☐

Plot Radial ☐ VIS2 ☐ Residuals ☒ Overplot model with cut angle 0.00

Plot sniffer map ☐ xmin -30 ymin -30 xmax 30 ymax 30 pixscale 10

Cuts in the chi2 space panel

Plot Chi2 ☐ 1D Parameter[flux_weight2] min -30 max 30 #samples 10

☒ log ☒ reduced ☐ with fit ☒ 2D Parameter[x2] min -30 max 30 #samples 10

Name	Type	Units	Value	MinValue	MaxValue	Scale	HasFixedValue
binary2.flux_weight2	flux_weight		1	0	0	1	☐
binary2.x2	x		0	0			☐

Run fit

Use max iterations ☐

Delete selection

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User Manual

arcturus_1.79mu_tutorial.xml

Settings tree

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Model panel:

Type: custom

Validate code

Share this model

Visit web repos...

Clone

 Description is missing
Short description is missing

Short description :

Description [\[en\]](#)

Code

```
func custom(ufreq, vfreq, wavelength, bandwidth, flux_weight, x, y) {
  1
}
```

Parameters

Name	Type	Units	Value	MinValue	MaxValue	Scale	HasFixedValue
flux_weight	flux_weight		0	0	0	1	☐
x	x		0	0			☐
y	y		0	0			☐

Run fit

Use max iterations ☐



Delete selection

Attach/Detach frame

User Manual

arcturus_1.79mu_tutorial.xml

Settings tree

- Settings
 - Files
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 - custom
 - Shared parameters[0]
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Model panel:

Type: binary

Validate code

Share this model

Visit web repos...

Clone



Model is currently in use, remove instance first to edit table of params. (WorkInProgress)

Short description : binary

Description [\[en\]](#)

binary puncts

Code

```
func binary(ufreq, vfreq, wavelength, bandwidth, flux_weight, x, y, flux_ratio, rho, PA) {
  1 q= flux_weight/(1. +flux_ratio);
  2 xy2 = lp_rho_PA_to_xy(rho, PA);
  3 return lpb_punct(ufreq, vfreq, q, x,y) + lpb_punct(ufreq, vfreq, q+flux_ratio, x+xy2(1),y+xy2(2));
}
```

Parameters

Name	Type	Units	Value	MinValue	MaxValue	Scale	HasFixedValue
flux_weight	flux_weight		0	0	0	1	☐
x	x		0				☐
y	y		0				☐
flux_ratio	flux_ratio		0				☐
rho	rho		0				☐
PA	PA		0				☐

Run fit

Use max iterations ☐

- User Models Homepage
- Models
- LITpro
- JMMC

Shared User

Introduction

Introduction TBD for the usermodels that LITpro can play with....

Search Description for

Browse Browse all models

Help Read documentation about custom user models (how does it work, available utility functions...)

TODO:

1. add code for every models : author link, date of publication
2. handle tags to classify models
3. provide rss feeds for all/models/comments
4. fix xml output of a model (limit to one if name parameter is given)
5. handle login (to avoid anonymous help edit)
6. send a model to LITpro through samp
7. force the user to provide all information: shortdesc, help (may be done onto the GUI side)
8. sort model lists by name, author, date
9. accept user comments for the models
10. handle versions to follow code updates
11. enhance new model registration process for the handling of user affiliation (show to check and propose to get one if empty...)
12. add a credit page for the web repository (existd/bootstrap...)

Last models:

RSS

- custom3 : Dummy
short desc
on 2013-07-11 by Guillaume Mella
test
- binary : binary
on 2013-07-11 by Isabelle Tallon-Bosc

Last comments:

- TODO

binary model

Short description

binary

Description

binary puncts

Code

```
binary(ufreq, vfreq, wavelength, bandwidth, flux_weight, x, y, flux_ratio, rho, PA) {  
  q= flux_weight/(1. +flux_ratio);  
  xy2 = lp_rho_PA_to_xy(rho, PA);  
  return lpb_punct(ufreq, vfreq, q, x,y) + lpb_punct(ufreq, vfreq, q*flux_ratio, x+xy2(1),y+xy2(2));  
}
```

Comments

Please [login](#) to enter comments

Model Info

Submitted: 2013-07-11

Version: 1

Author: Isabelle Tallon-Bosc
(CRAL)

Tags:

Status: 

Comments:0

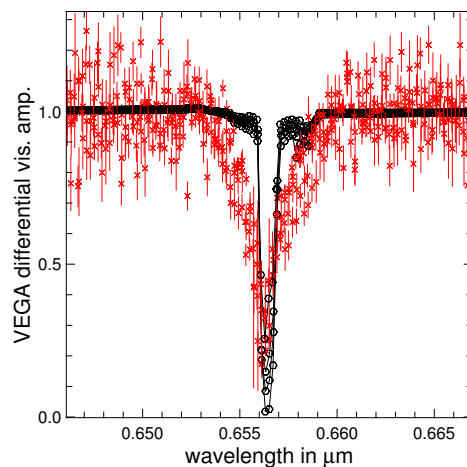
UID: d7f8a169-7fa8-4600-b9fc-bd93abc561eb

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- User functions
- **OIFITS2**
- Effets instrumentaux
- Format → OImaging
- Barres d'erreur

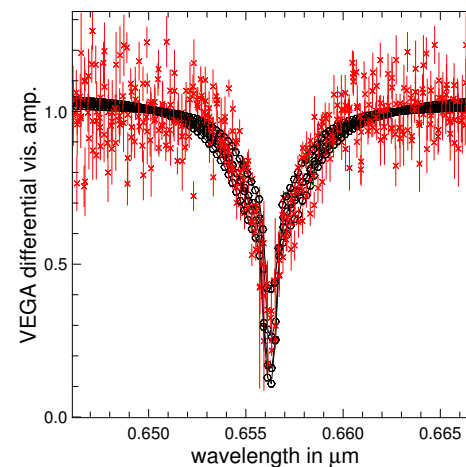
- A faire :
 - Read OIFITS2 format : cf MiRA2
 - *OI_SPECTRUM* --> *OI_FLUX*
- LITpro already fits SED and visibilities simultaneously

- Fitters locaux
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- smearing cf MiRA2 ?
 - adapt the model of data with the instrument (identified by keywords *INSTRUME/INSMODE*)
- ex.: prototypic work on the VEGA differential visibilities (*OI_VIS*) on PCygni (POLCA project)



without



with

a model of the instrument

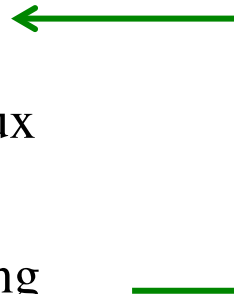
- Fitters locaux
- Fitters globaux
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- OIFITS2
- Effets instrumentaux
- **Format → OImaging**
- **Barres d'erreur**

- OImaging: cf Mira2 ?
- Barres d'erreur :

actuellement, une seule estimation (χ^2 curvature)

A faire : resampling, MCMC, ...

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à traiter plus tôt

discussions du planning en séance