



Les nouveautés en Photométrie d'ouverture avec Siril1.4 et +++

Atelier RAPAS 05 juillet 2025

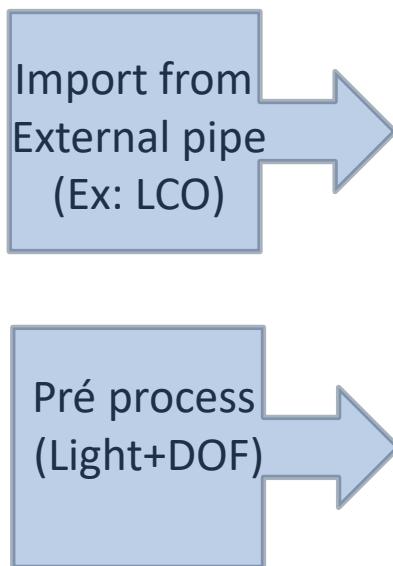
F Denjean



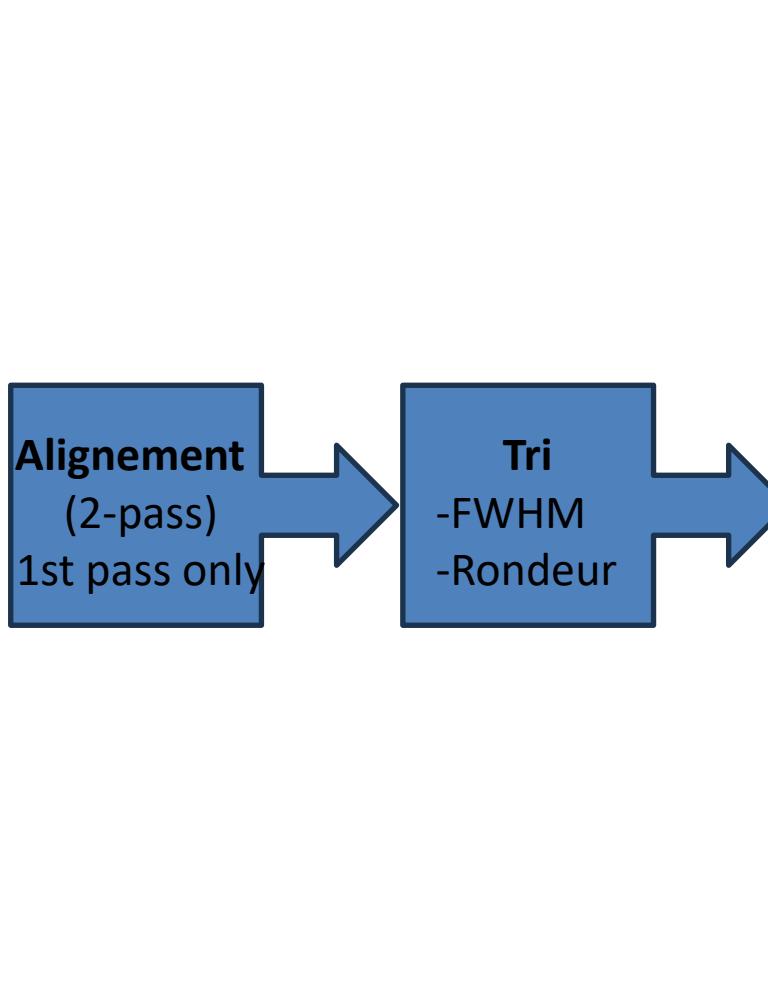
Exemple sur 2 cas d'utilisation

Préliminaire

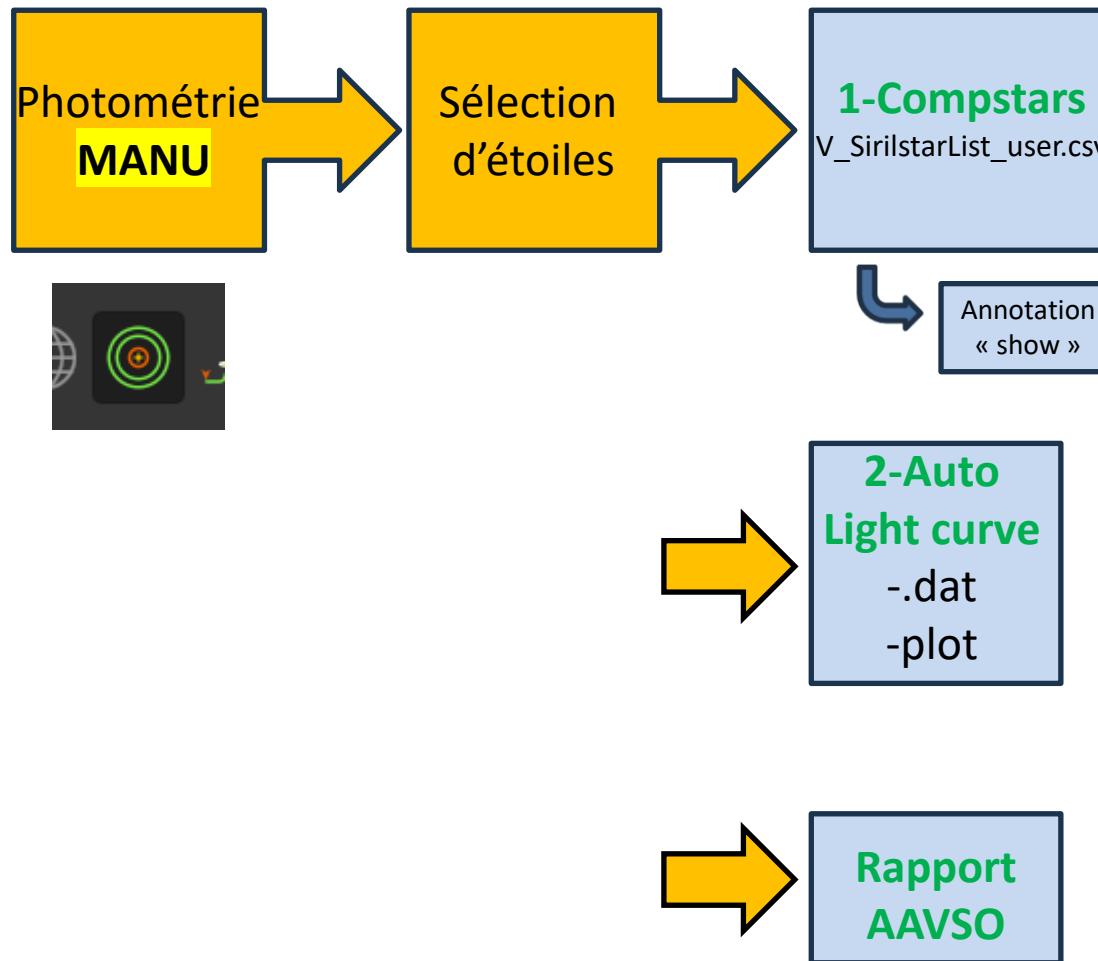
Pré-traitement



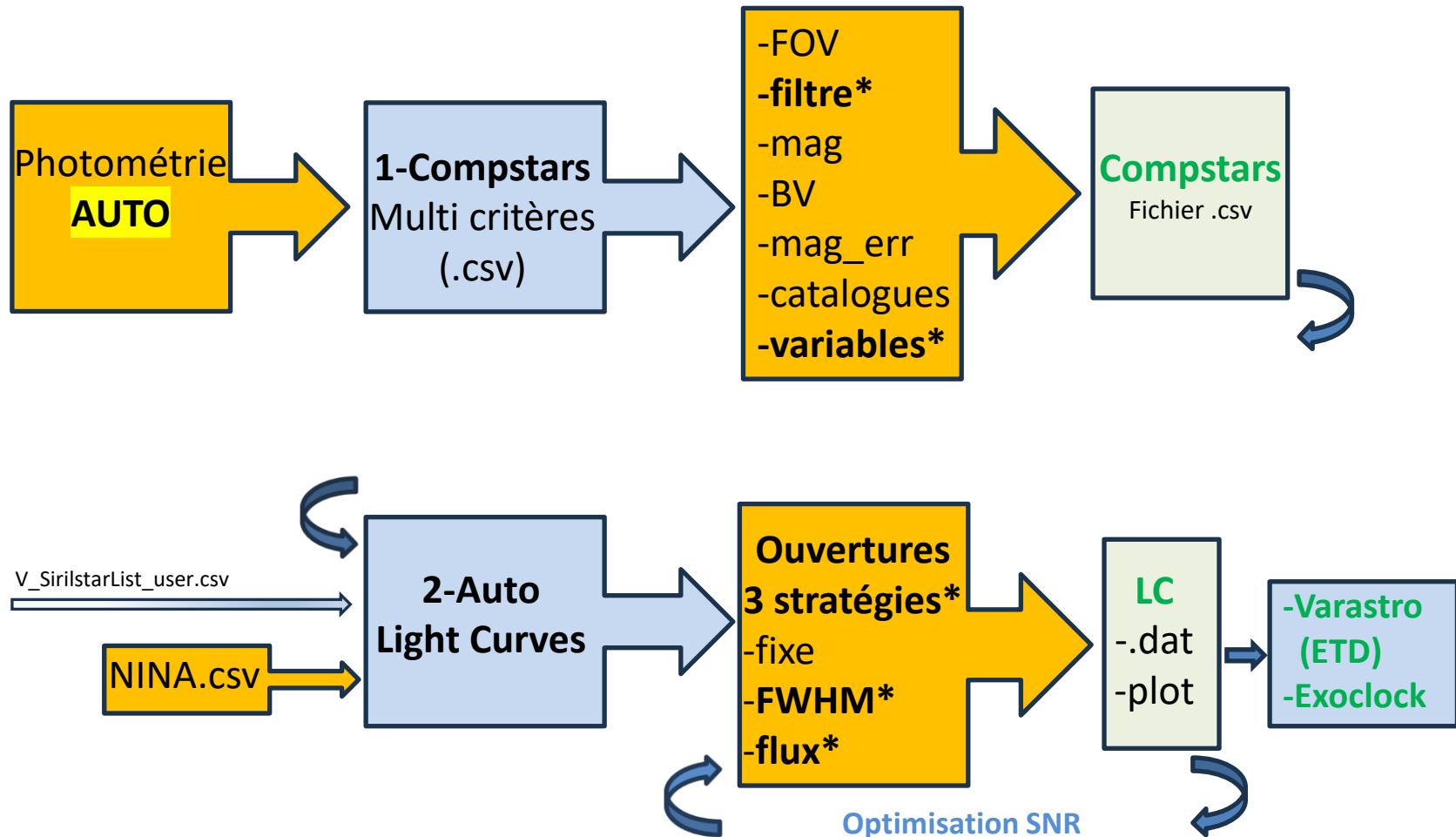
$$L_c = \frac{L - D}{F - O}.$$



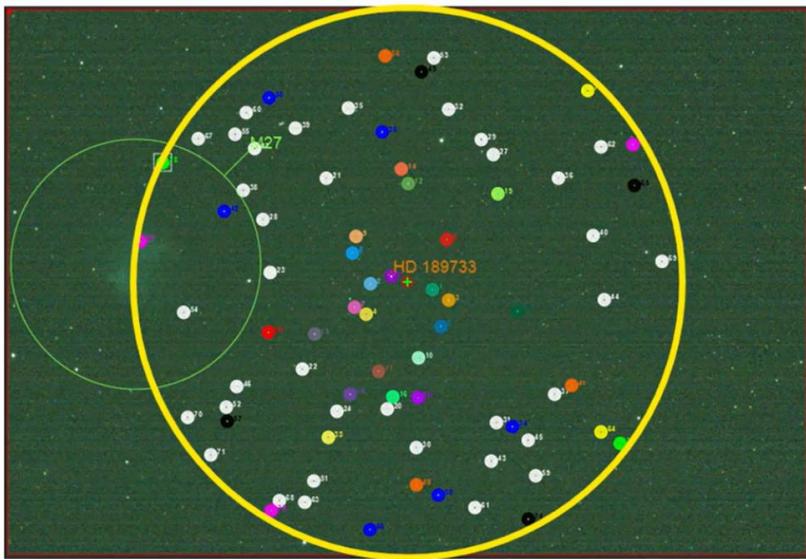
Photométrie Manuelle



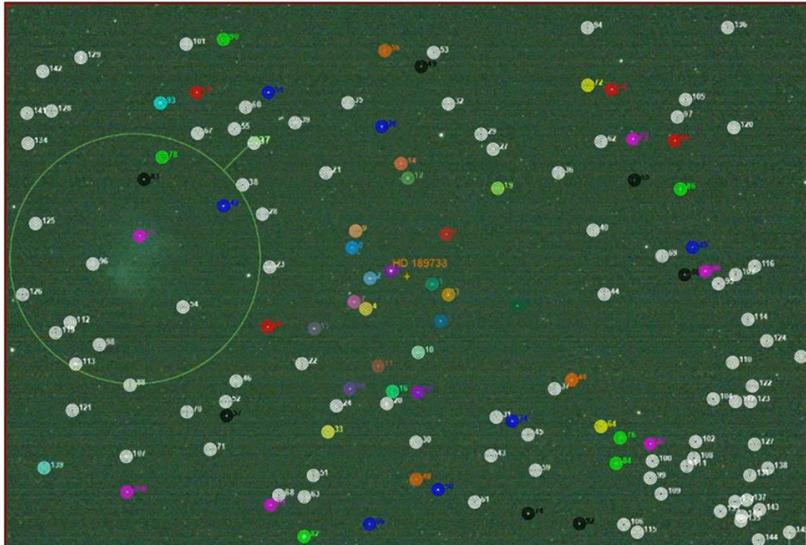
Photométrie Automatique



Compstars – critère de FOV



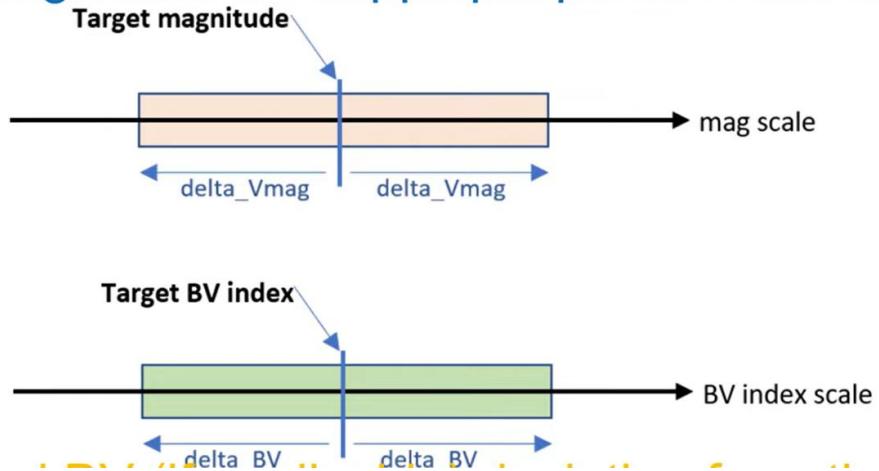
Narrow field of view



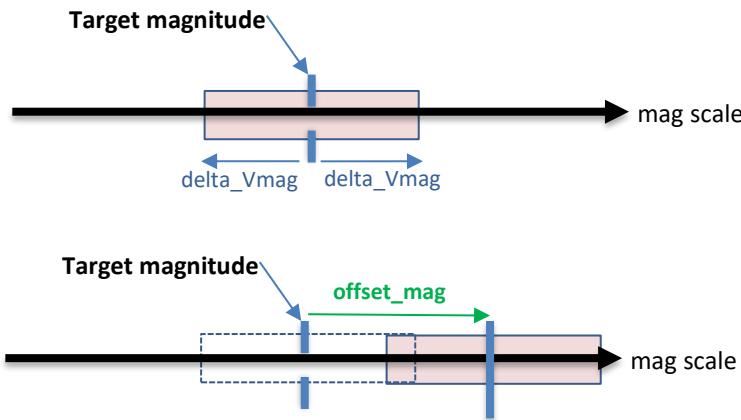
Narrow field of view

Compstars – critère de mag/BV/Err

- Écart de magnitude et de BV (si applicable) par rapport à l'étoile cible
 - A minimiser si possible...
 - ... pour avoir au max 19 étoiles de comparaison
- L'erreur de Magnitude ne s'applique pas à NOMAD



Compstars – critère de mag



Compstars – Les catalogues

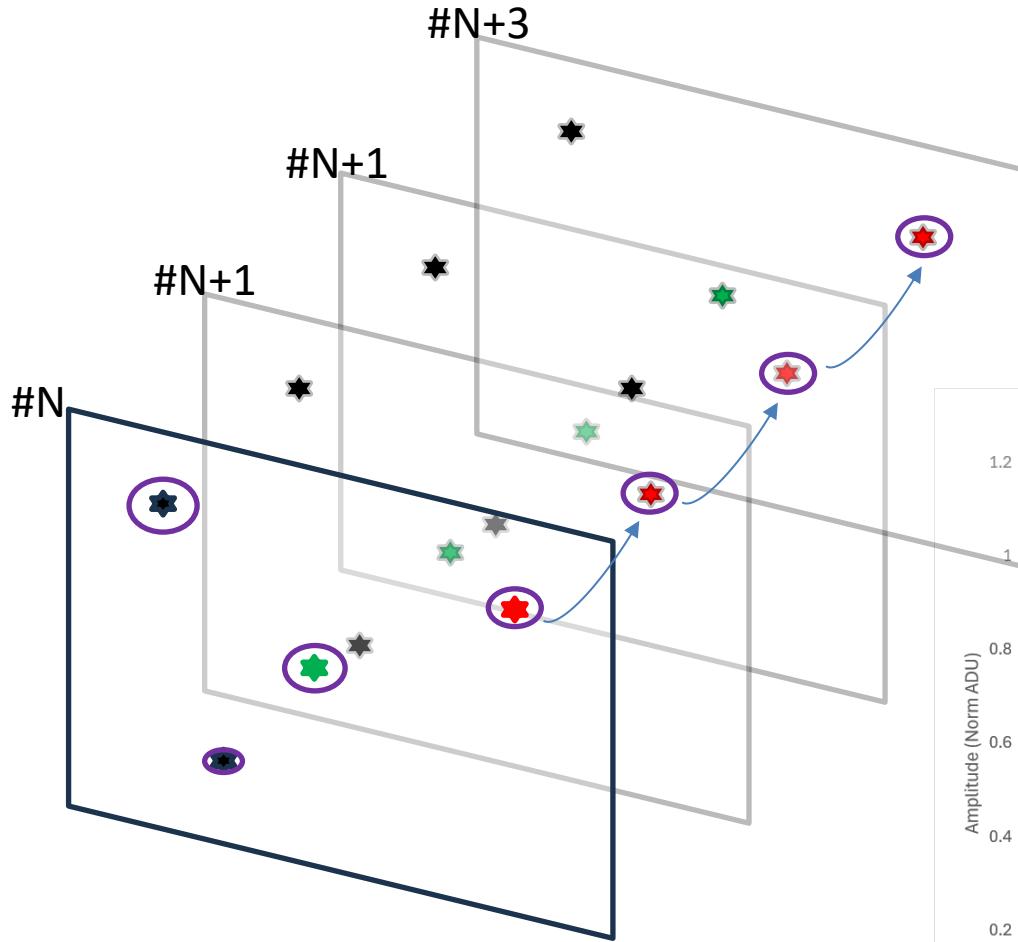
Photometric Filters vs catalogues

- **APASS** : BVg'r'i' filters
- **NOMAD** : BVRJHK (no magnitude error)
- **GAIA** (DR3) : G, GBp, GRp

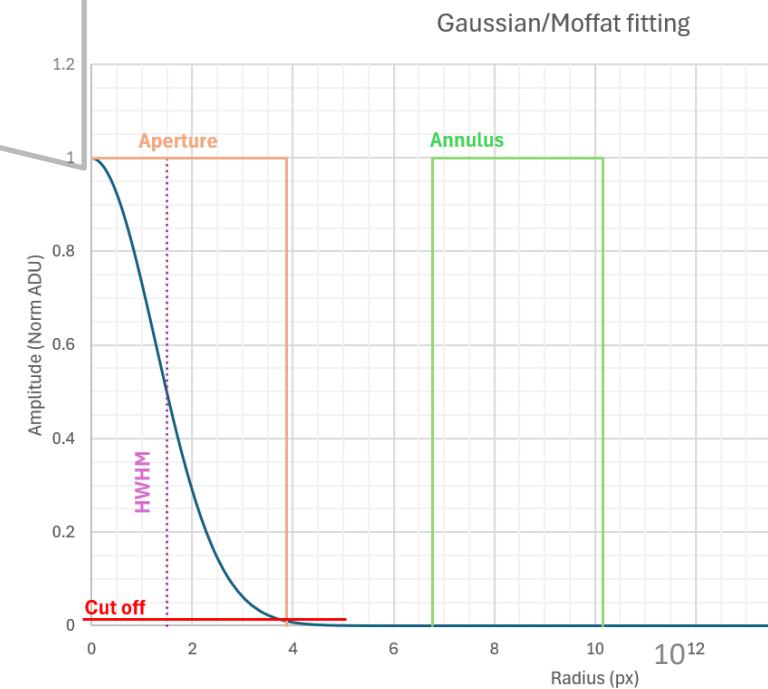
Variable stars catalogues

- **VSX** : from AAVSO
- **GCVS** : General Catalogue of Variable Stars
- **Varisum** : "Variable objects" from Gaia DR3

Les stratégies d'ouvertures



- Ropen, Rsky: cste
- Ropen, Rsky \propto HWHM
- Ropen %flux, Rsky \propto Ropen



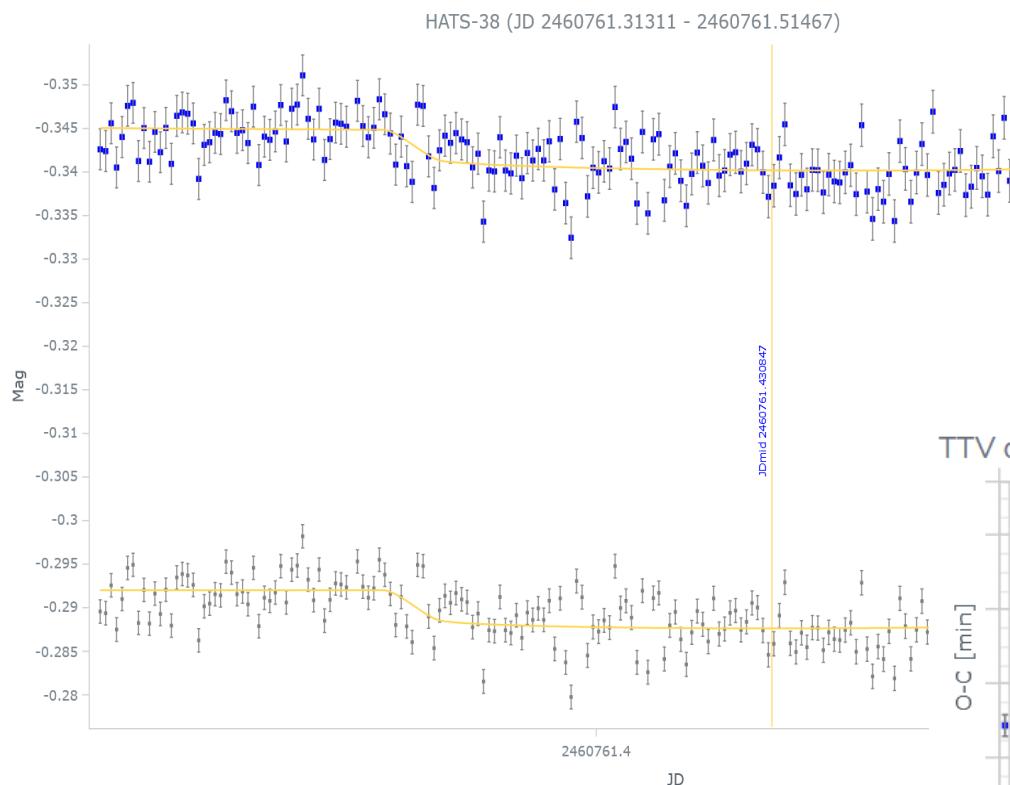
Exoplanète - Les mesures

```
ch image; this is compatible with the current memory and thread limits, up to 20 thread(s) can be used.
15: PSF on area: with the current memory and thread limits, up to 20 thread(s) can be used.
15: PSF on area: processing.
17: Sequence processing succeeded.
17: Execution time: 2.07 s
17: Photometry for star at 21.0. 519.4 in image 0
17: Using 14 stars to calibrate the light curve
17: Comp. SuperStar -- mag: 12.661 (+- 5.13mmag) - Filter Band: r'
17: Vstar Abs. Mag. -- (197 images) median: 12.410mag (+- 7.04mmag)
17: V-C Error bars -- (197 images) median: 4.80mmag, max: 5.07mmag, min: 4.67mmag, delta: 0.20mmag
17: Variable star SNR-- (197 images) median: 23.93dB, max: 24.04dB, min: 23.70dB
17: Calibrated data for 197 points of the light curve, 0 excluded because of invalid entry
17: photometry\light_curve.dat has been saved.
17: photometry\light_curve.png has been saved.
```

result of interest

Exoplanète – Varastro

Light curve



Determined transits

- **2460761.43085** (3/26/2025, 22:20)

Planet designation: **HATS-38 b**

HJD_{mid}: **2460761.43539** +/- 0.00181

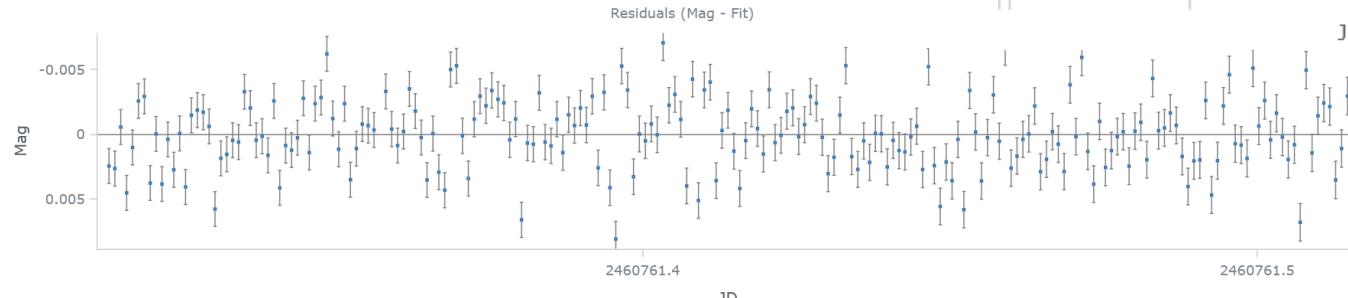
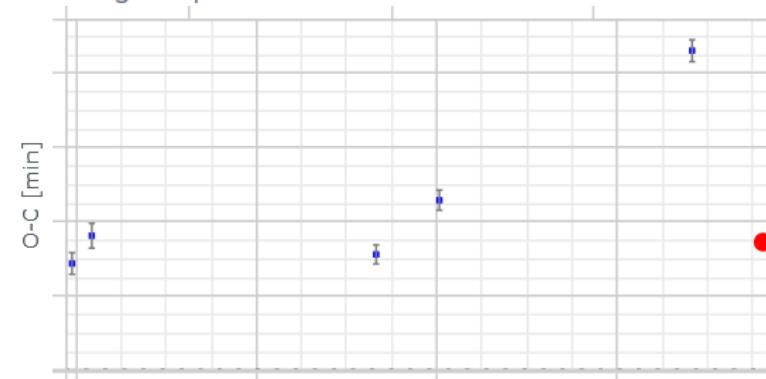
Heliocentric correction: **0.00454**

Transit depth (Mag): **0.00438** +/- 0.00048

Transit duration (Min): **195.88** +/- 5.60

vs 4.0mmag / 202min

TTV diagram preview:



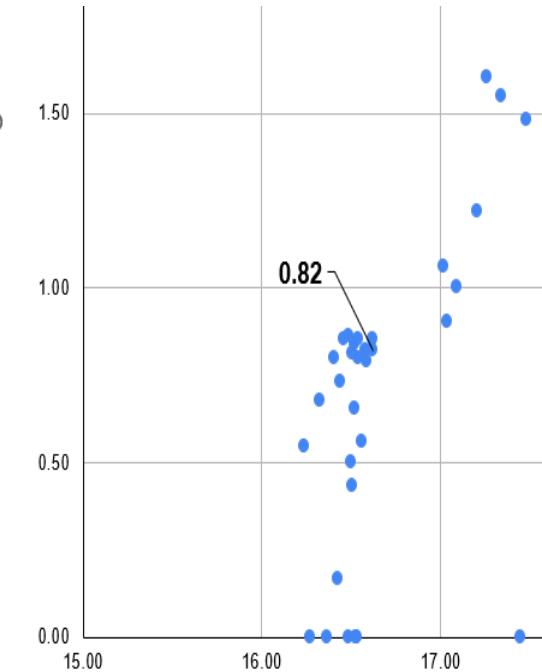
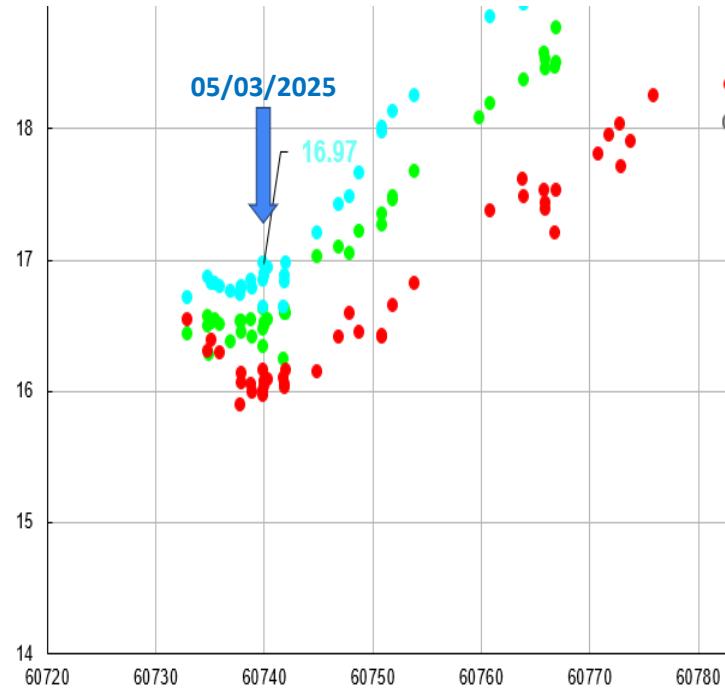
Magnitude SN - Les mesures

Result of interest

```
23:10:32: Photometry for star at x  1625.5, y  5251.5  Filter: G
23:10:32: Using 17 stars to calibrate the light curve
23:10:32: Comp. SuperStar  -- mag: 16.373 (± 0.70mmag) - Filter Band: G
23:10:32: Vstar Abs. Mag.  -- (6 images) mean : 16.589mag (± 98.45mmag)
23:10:32: V-C Error bars  -- (6 images) median: 98.99mmag, max: 114.04mmag, min: 78.89mmag,
23:10:32: Variable star SNR-- (6 images) median: 10.51dB,  max: 11.53dB,  min: 9.86dB
23:10:32: Calibrated data for 6 points of the light curve, 0 excluded because of invalid phot
23:10:32: photometry\light_curve.dat has been saved.
```

Magnitude SN – RAPAS

DATE	UTC HH:MM:	MJD
06/03/2025	09:50:24	60 733.01
28/02/2025	20:31:00	60 734.86
28/02/2025	21:52:00	60 734.91
28/02/2025	22:19:00	60 734.93
01/03/2025	04:38:53	60 735.19
01/03/2025	10:53:02	60 735.45
01/03/2025	11:05:55	60 735.46
01/03/2025	11:39:29	60 735.49
01/03/2025	11:54:58	60 735.50
01/03/2025	23:00:38	60 735.96
02/03/2025	23:04:50	60 736.96
03/03/2025	23:50:48	60 737.99
03/03/2025	21:06:46	60 737.88
03/03/2025	23:24:43	60 737.98
04/03/2025	21:34:27	60 738.90
04/03/2025	22:03:22	60 738.92
05/03/2025	21:39:53	60 739.90
05/03/2025	22:06:00	60 739.92
05/03/2025	22:30:05	60 739.94
05/03/2025	00:28:31	60 740.02
06/03/2025	00:52:37	60 740.04
06/03/2025	09:50:24	60 740.41

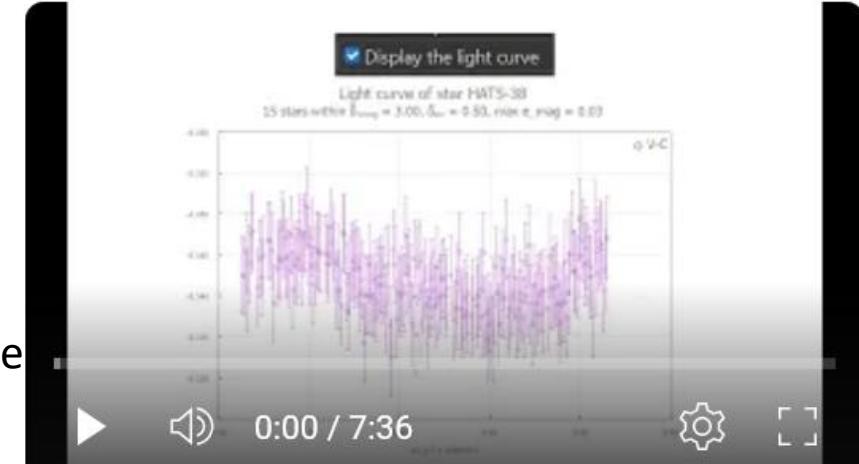


Marc Serrau	magV=16.68+/-0.04
Fred DENJEAN	6x120s
Bernard Tregon	30x60s /filtre
Florent Losse	Réduit avec Tycho,
Pierre-Yves Lechaplain	
Thomas Salmon	5 7x3' / filtre

Conclusions

- Aide au choix des **étoiles de comparaison** (suivants critères et catalogue)
- Sauvegarde sous forme d'un **fichier** pour Réutilisation / Partage
- Photométrie d'ouverture **automatique** sur la séquence
 - **3 stratégies d'ouverture**
- **Courbe de lumière:** image et fichier .dat
- Mesure de **magnitude**

La version XPhoto-Siril en version portable
est dispo sur ce lien YT:



Procédure pas à pas du traitement d'une Exoplanète avec XPhoto-Siril
<https://www.youtube.com/watch?v=k03EJzAE15M>