

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

Atelier RAPAS 05 juillet 2025

F Denjean

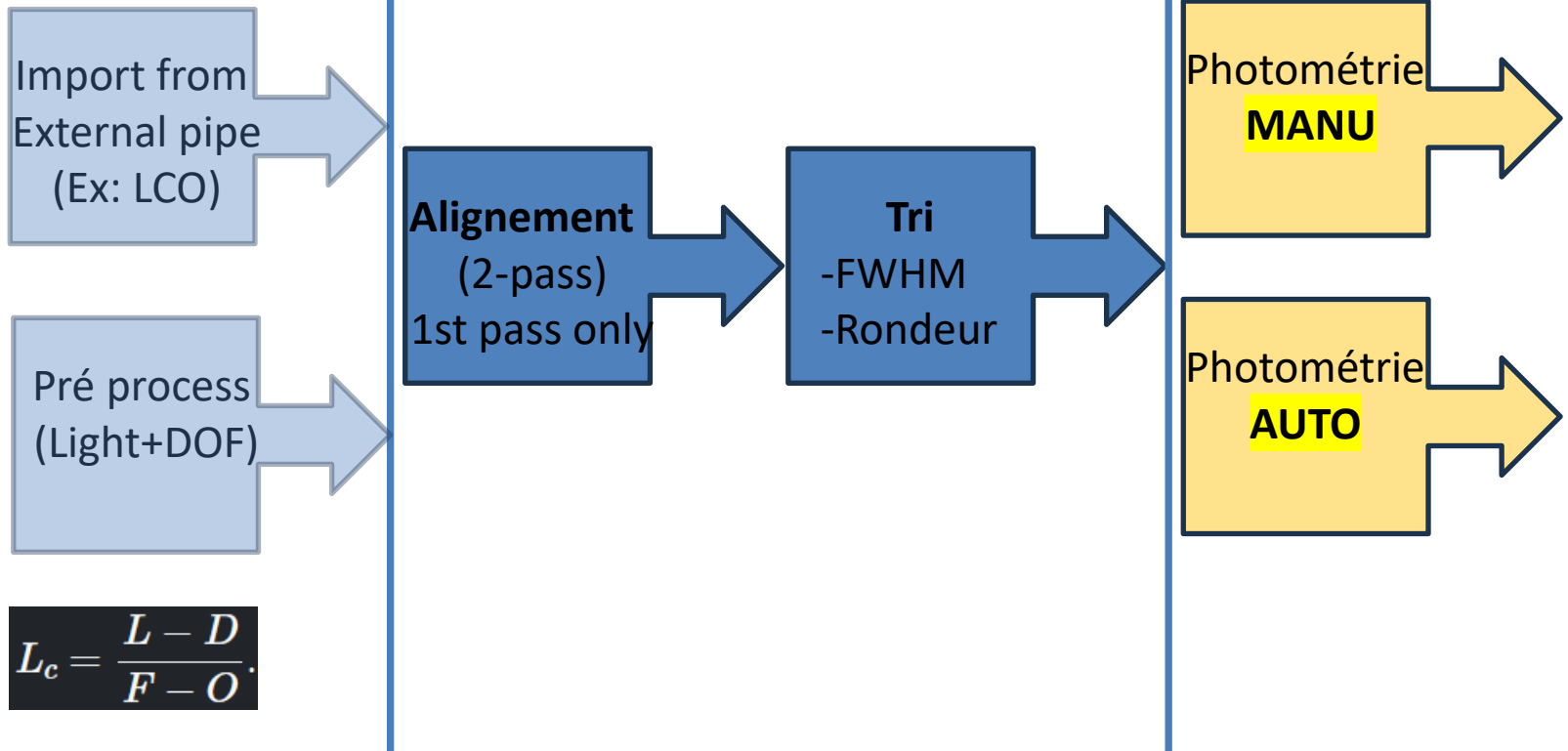


Exemple sur 2 cas d'utilisation

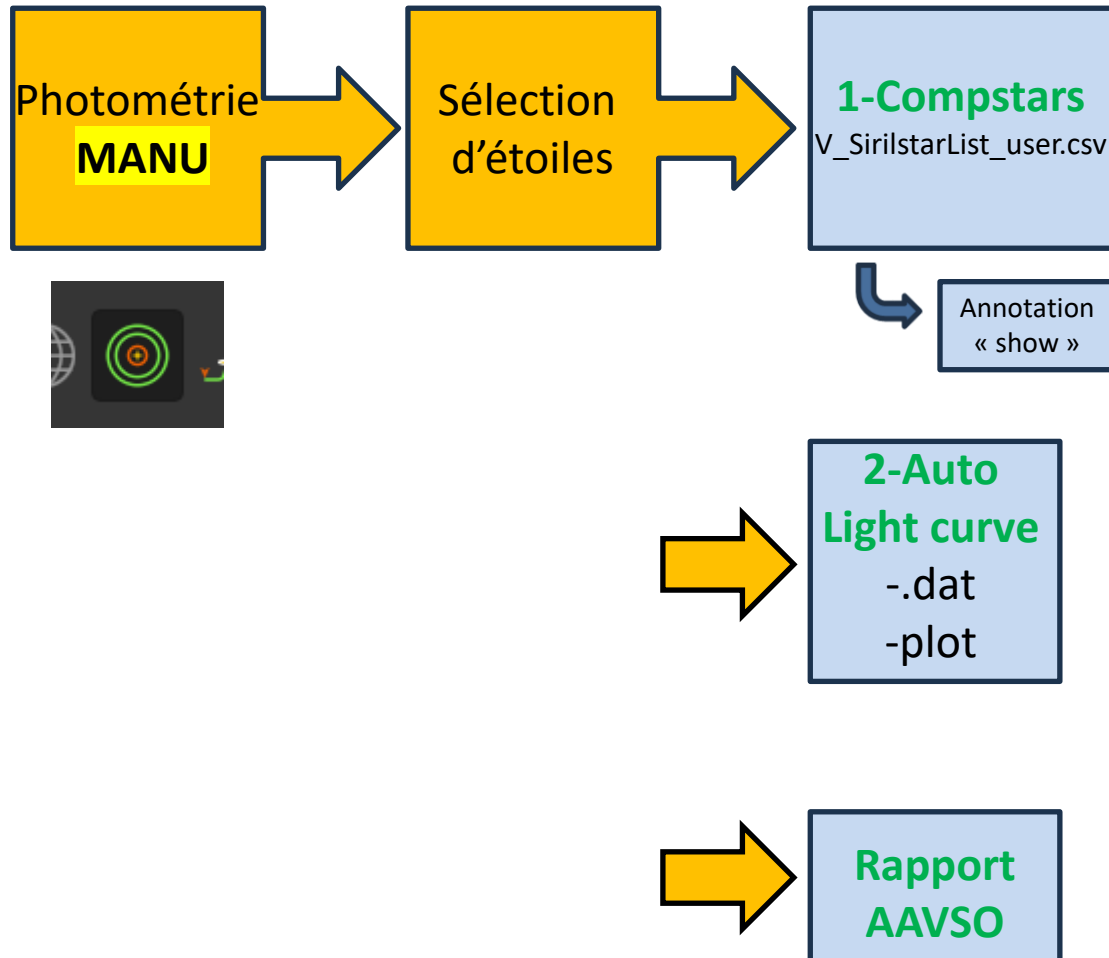
- Traitement d'une exoplanète: courbe de lumière
 - HATS-38 HATS-38 (Exoclock): depth=4mmag
duration: 3.22h (202min)
magR= 12.05, magV = 11.97
- Traitement d'une supernova: mesure de sa magnitude
 - SN 2025coe

Préliminaire

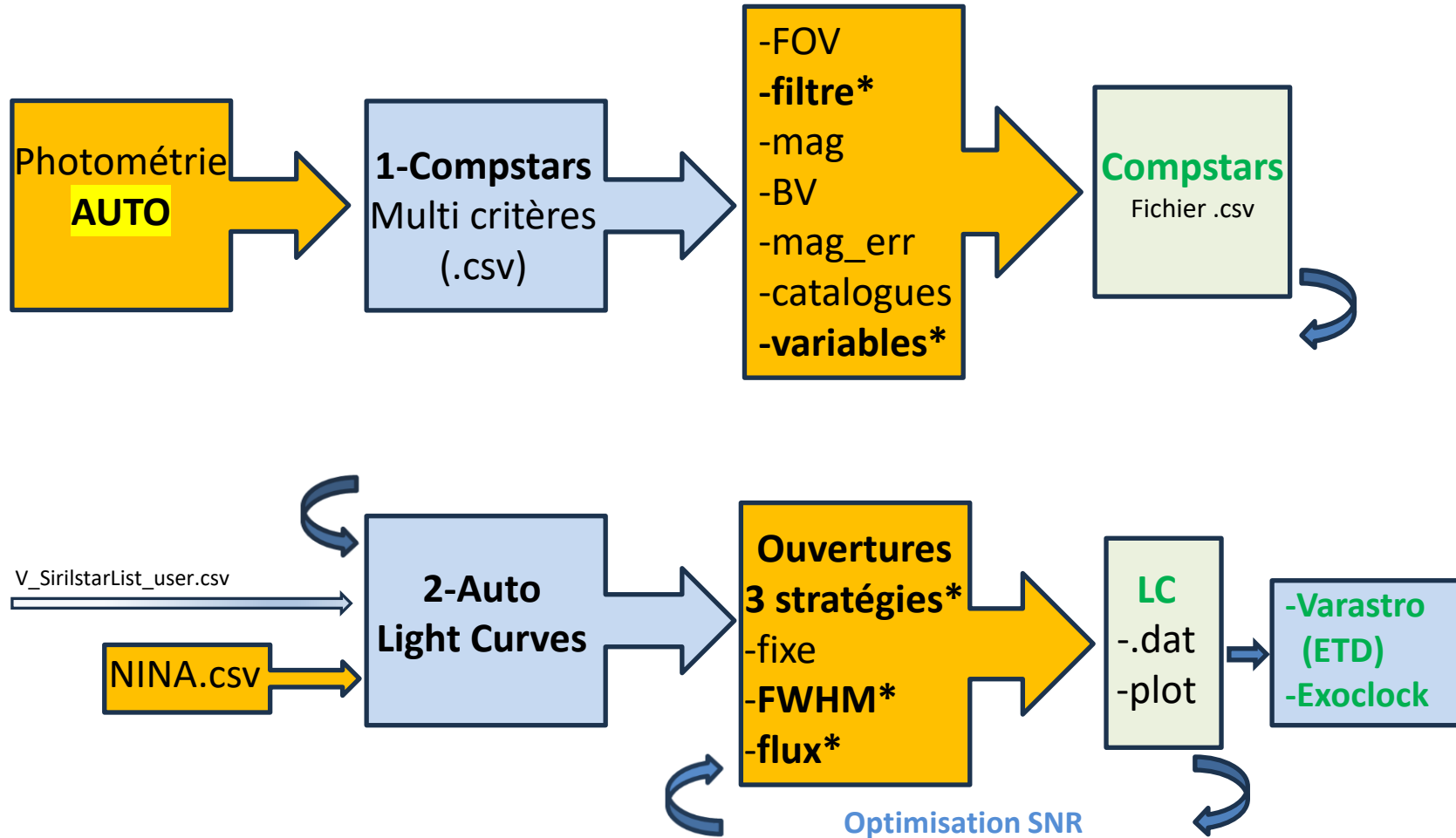
Pré-traitement



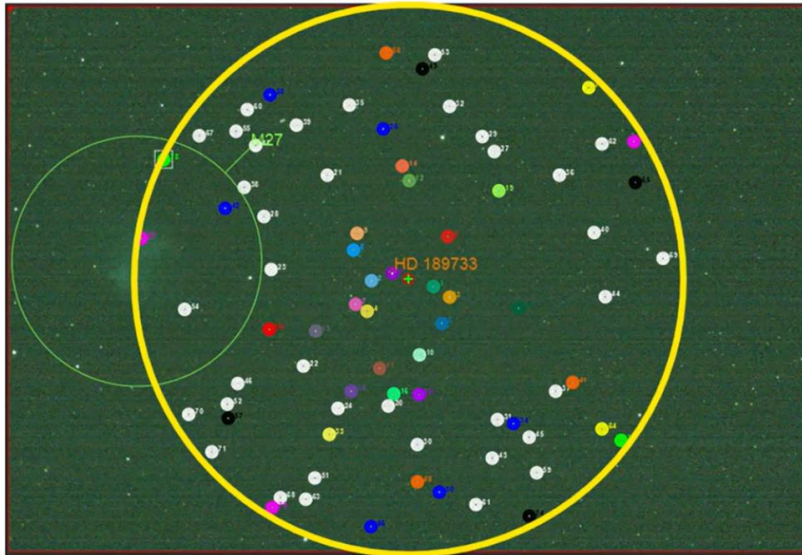
Photométrie Manuelle



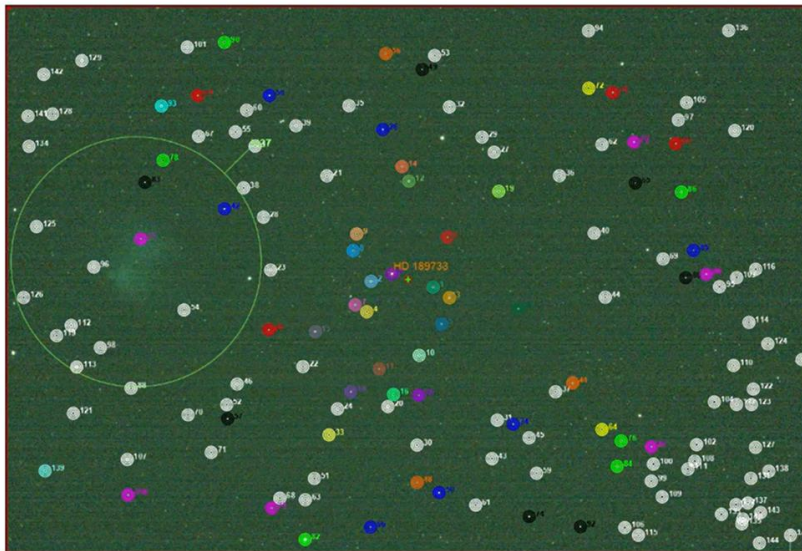
Photométrie Automatique



Compstars – critère de FOV



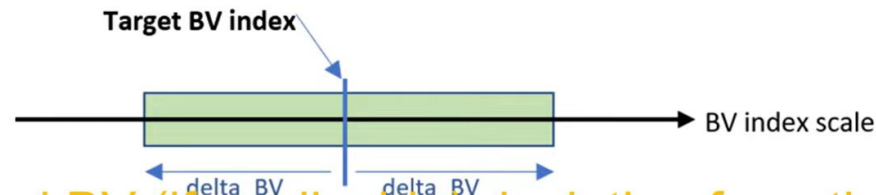
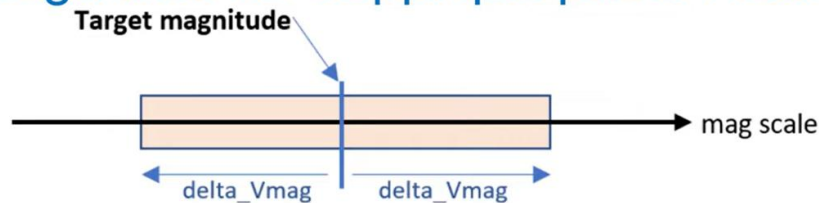
☒ Narrow field of view



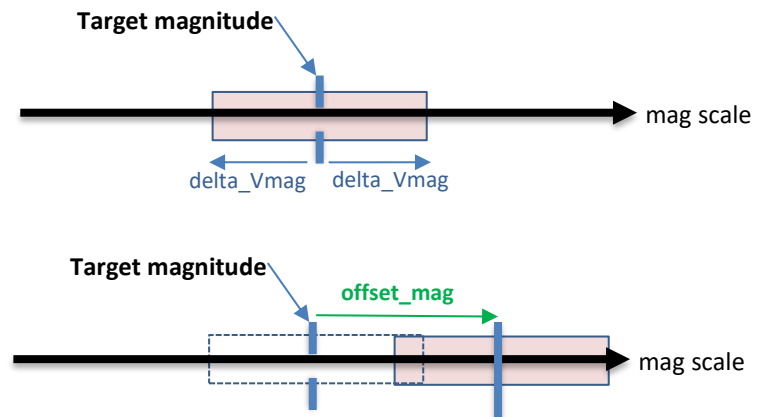
☐ Narrow field of view

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

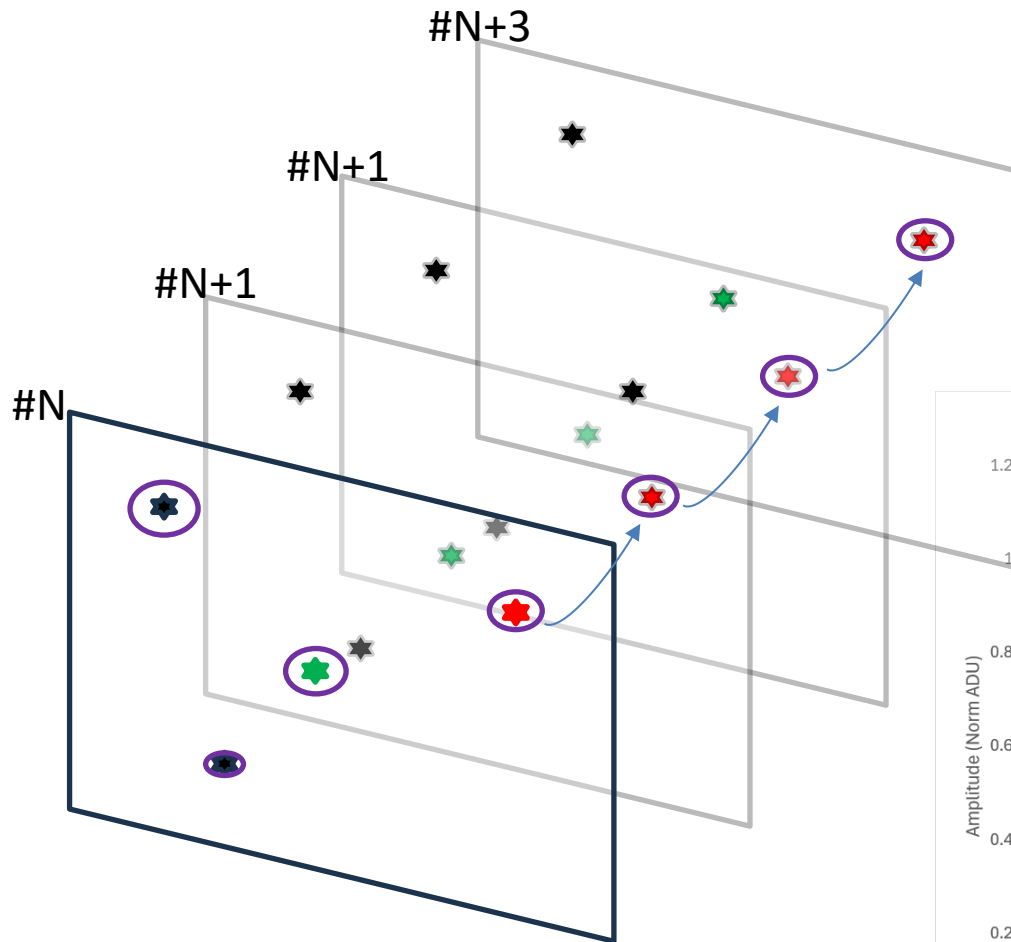
Photometric Filters vs catalogues

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

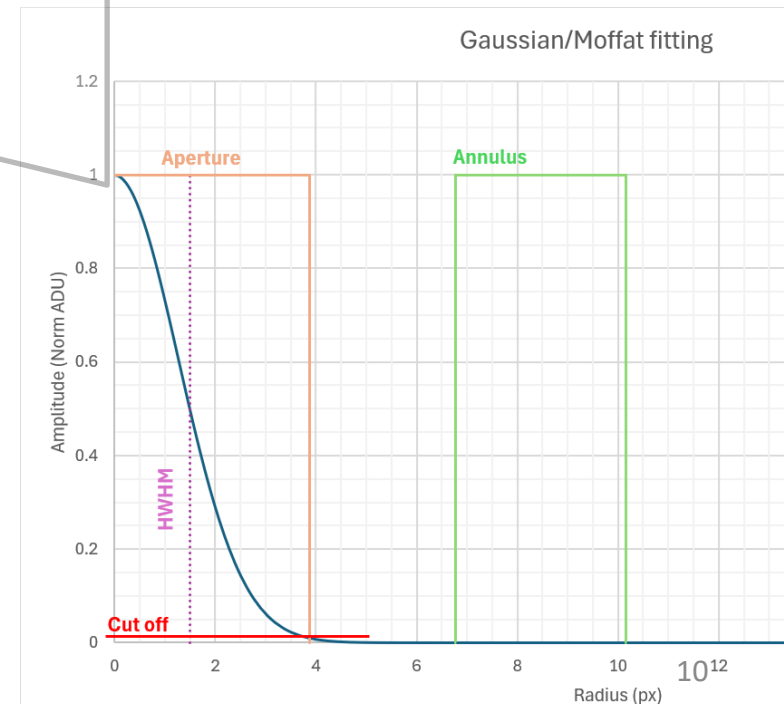
Variable stars catalogues

- **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



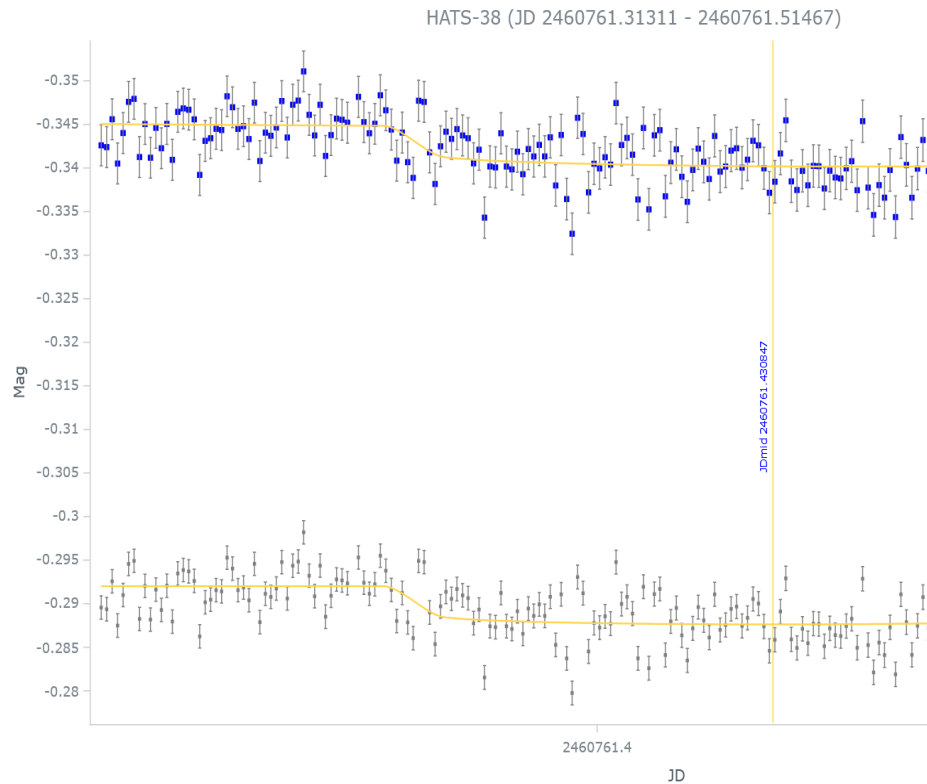
Exoplanète - Les mesures

```
ch image; this is compatible with the current processing.
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 211.0, 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
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
etry
17: photometry\light_curve.dat has been saved.
17: photometry\light_curve.png has been saved.
```

result of interest

Exoplanète – Varastro

Light curve

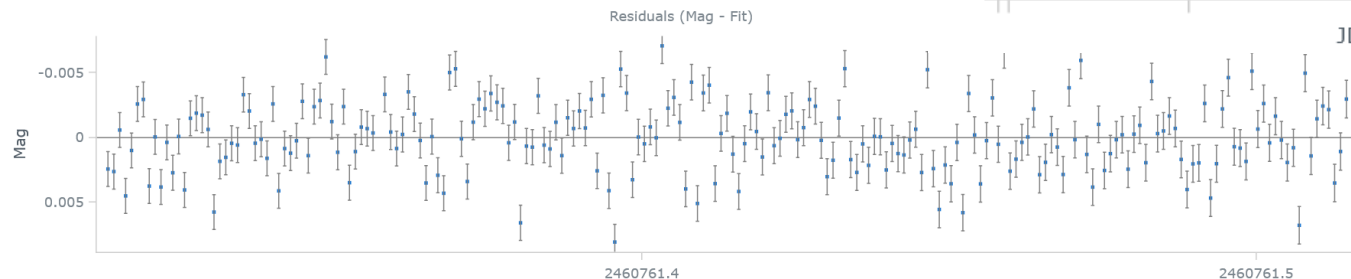
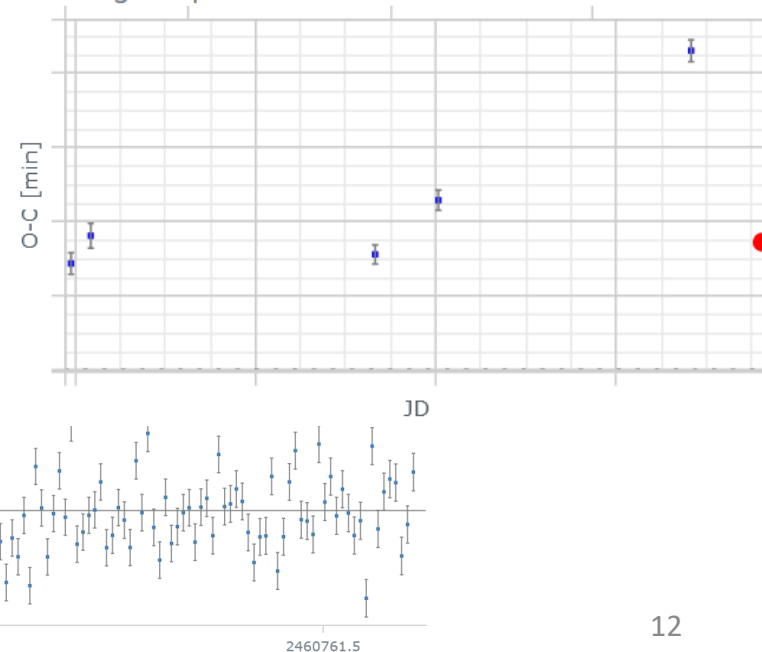


Determined transits

- ☒ **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:



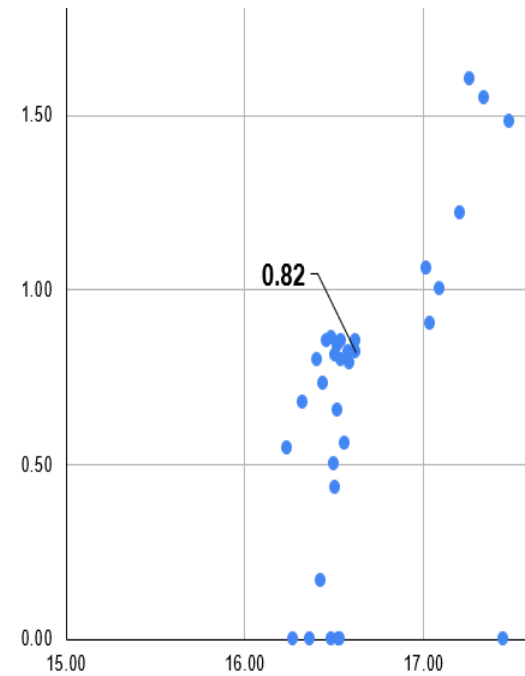
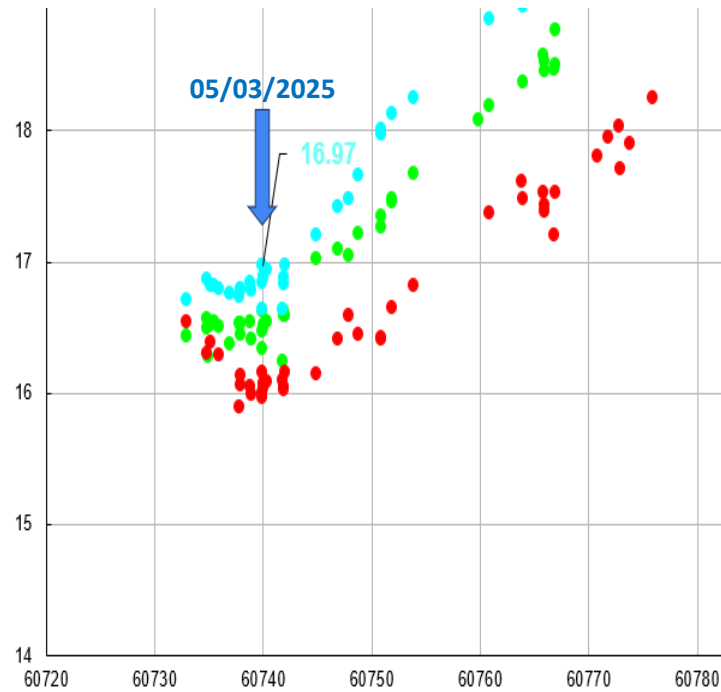
Magnitude SN - Les mesures

Result of interest

```
23:10:32: Photometry for Star at X = 1029.8, Y = 5251.5, Image 10
23:10:32: Using 17 stars to calibrate the light curve
23:10:32: Comp. SuperStar -- mag: 16.373 ( $\pm 0.70\text{mmag}$ ) -- Filter Band: G
23:10:32: Vstar Abs. Mag. -- (6 images) mean : 16.589mag ( $\pm 98.45\text{mmag}$ )
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

6			
7			
8			
9			
0			
1	DATE	UTC HH:MM	MJD
2	06/03/2025	09:50:24	60 733.01
3	28/02/2025	20:31:00	60 734.86
4	28/02/2025	21:52:00	60 734.91
5	28/02/2025	22:19:00	60 734.93
6	01/03/2025	04:38:53	60 735.19
7	01/03/2025	10:53:02	60 735.45
8	01/03/2025	11:05:55	60 735.46
9	01/03/2025	11:39:29	60 735.49
0	01/03/2025	11:54:58	60 735.50
1	01/03/2025	23:00:38	60 735.96
2	02/03/2025	23:04:50	60 736.96
3	03/03/2025	23:50:48	60 737.99
4	03/03/2025	21:06:46	60 737.88
5	03/03/2025	23:24:43	60 737.98
6	04/03/2025	21:34:27	60 738.90
7	04/03/2025	22:03:22	60 738.92
8	05/03/2025	21:39:53	60 739.90
9	05/03/2025	22:06:00	60 739.92
0	05/03/2025	22:30:05	60 739.94
1	06/03/2025	00:28:31	60 740.02
2	06/03/2025	00:52:37	60 740.04
3	06/03/2025	09:50:24	60 740.41

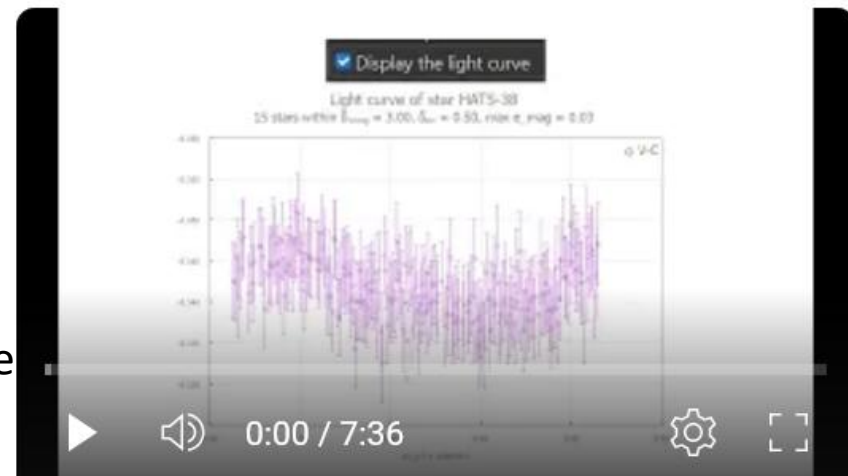


MJD	mag	magV	magB	magR	magI	magZ	magY	magJ	magH	magK	Observer
60740.90	16.46	0.05	16.84	0.04	15.99	0.18	0.85				Marc Serrau magV=16.68+/-0.04
60740.92	16.62	0.11	16.97	0.10	16.15	0.08	0.82				Fred DENJEAN 6x120s
60740.94	16.33	0.09	16.64	0.11	15.96	0.10	0.68				Bernard Tregon 30x60s /filtre
60740.02	16.49	0.06	16.89	0.02	16.03	0.03	0.86				Florent Losse Réduit avec Tycho,
60740.04	16.51	0.01	16.88	0.01	16.07	0.02	0.81				Pierre-Yves Lechapelain
60740.41	16.54	0.02	16.93	0.03	16.08	0.03	0.85				Thomas Salomé 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>