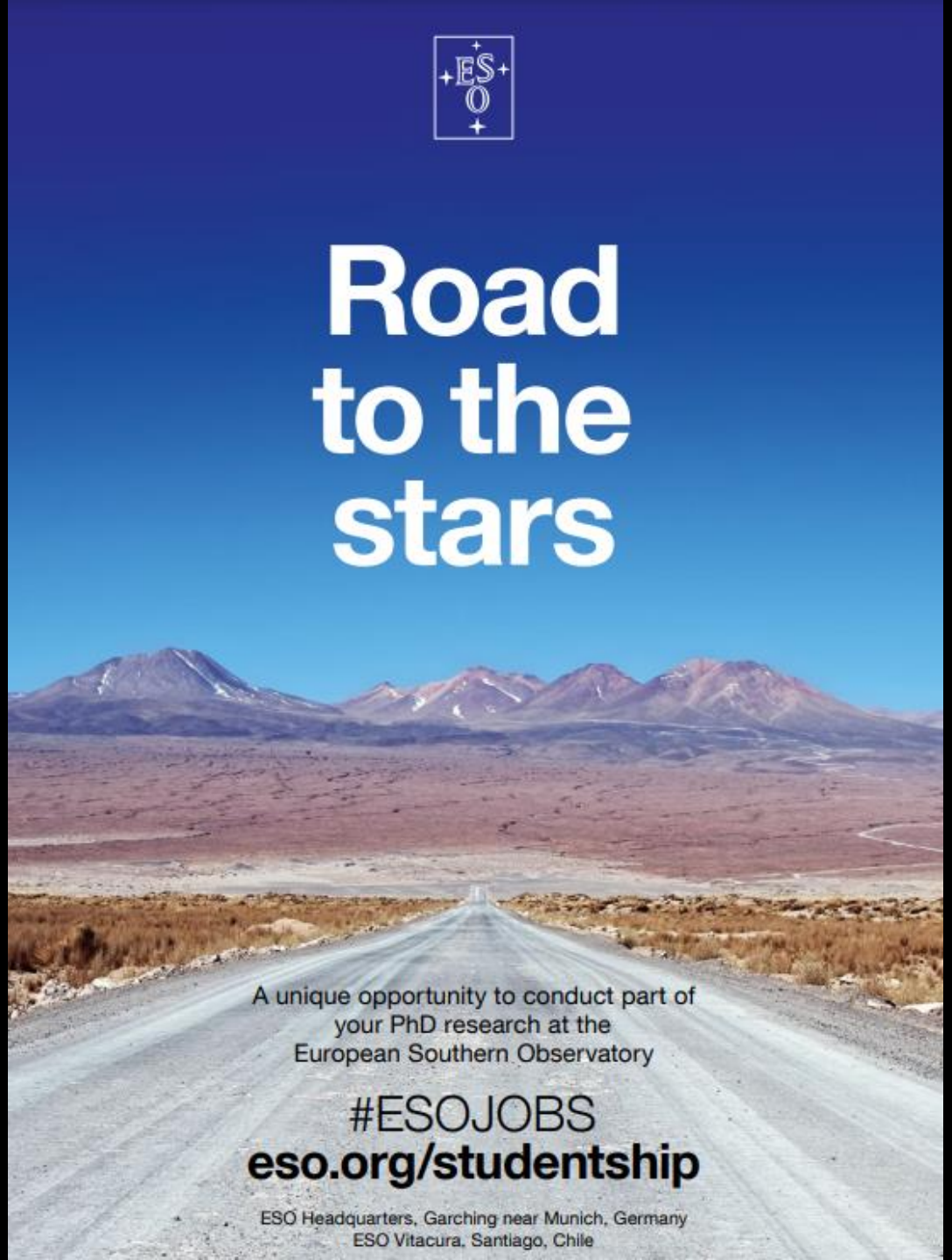
ESO Studentship (MEYS): Personal Experience

Ministry of Education, Youth and Sports

Alžběta Oplištilová

e-mail: betsimsim@seznam.cz



Germany, Garching near Munich

Chile, Santiago

6 or 12 months (with possible extension)

up to 32 years

fields: astronomy, astrophysics, software engineering, electronic engineering, mechanical engineering, control engineering, operations engineering, project management

allowance 2 000-3 000 euro

Application process

3 rounds:

writen – cover letter

- 2 reference letters
- CV
- education certificate
- application with your project

interview with Czech ESO committee

interview with ESO Garching/Santiago committee

motivation

introduction

research interest

topics of thesis/theses

current project

special experience

what you want to learn

Before arrival

supervisor, co-supervisor(s)

contract

information how ESO work

health insurance

accommodation

- ESO flats
- dormitories – GLC, SLC
- rental in Garching / Munich / Eching / Ismaning
- ESO reality agency

Student Representatives

Talk to me about...

✨New email address: student-reps@eso.org ✨

Amanda Rubio

- Science Talks & Yellow Box Support
- Fellows Communication
- Mental Health Support

Amanda.Rubia@eso.org \\ E.4.24

Alice Somigliana

- Office for Science communication
- Summer Research Programme

Alice.Somigliana@eso.org \\ E.5.24

Giulia Roccetti

- Welcoming New Students
- Equality, Diversity and Inclusion
- Mental Health Support

Giulia.Roccetti@eso.org \\ E.5.05

Thomas Winterhalder

- Leaving Presents
- Student Working Group
- Welcoming New Students

Thomas.Winterhalder@eso.org \\ E.5.04

Ivanna Langan

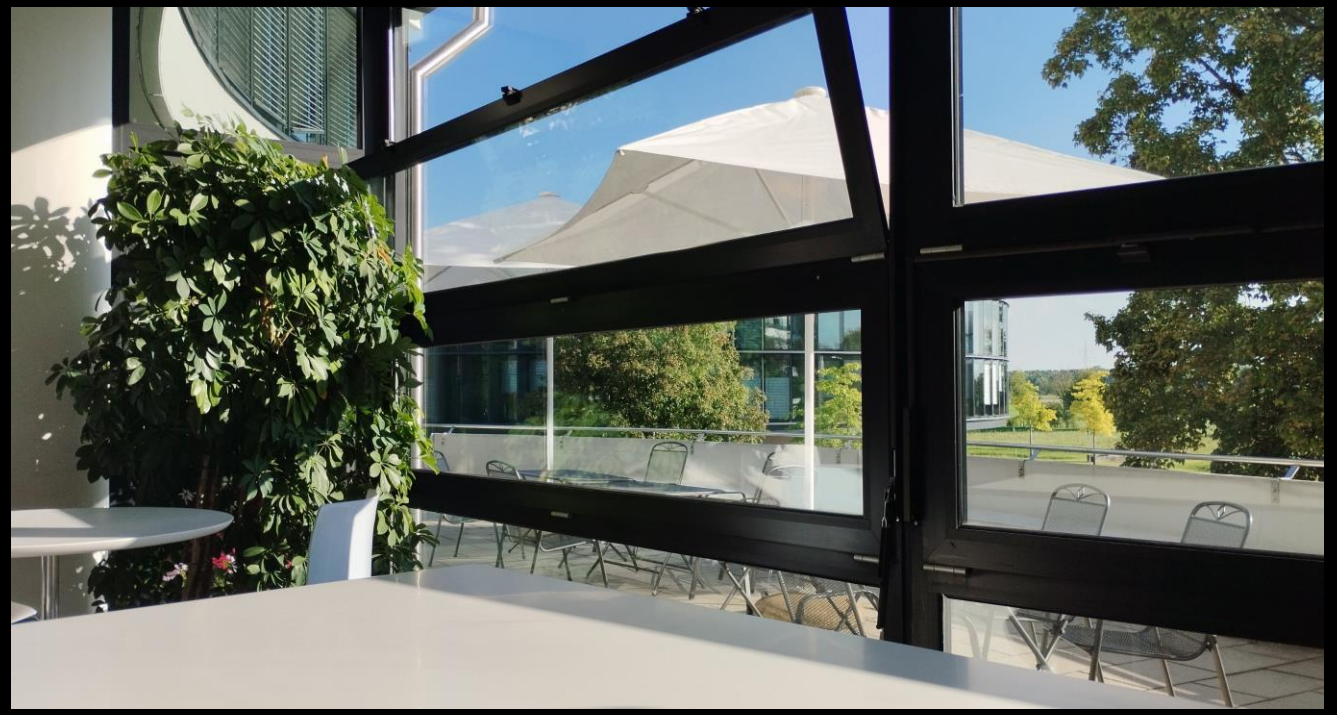
- Leaving Presents
- Alumni Contact
- Equality, Diversity and Inclusion

Ivanna.Langan@eso.org \\ E.4.30

GLC - Garching Living Center

GLC - single appartment

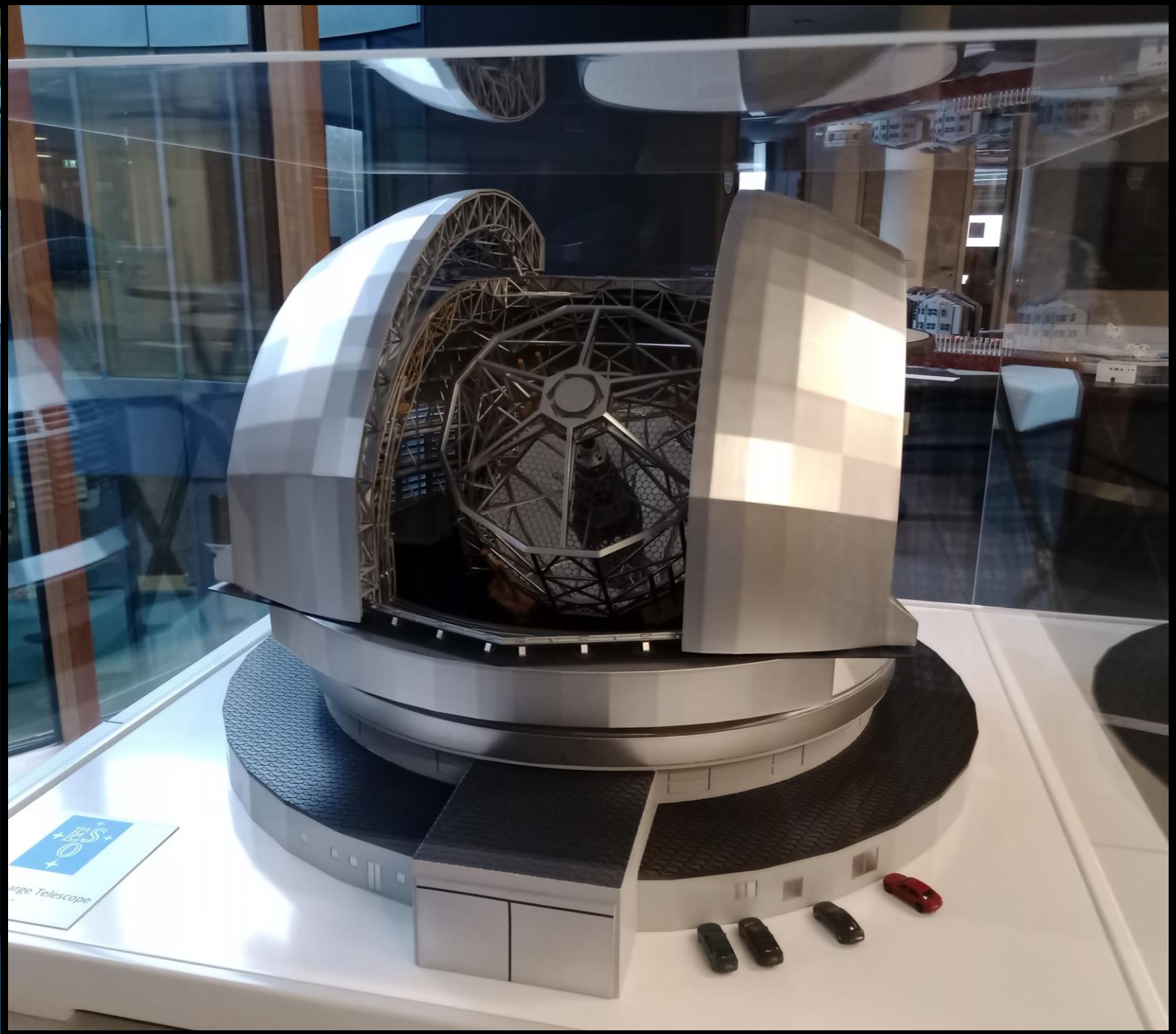
First day at ESO



Skylight

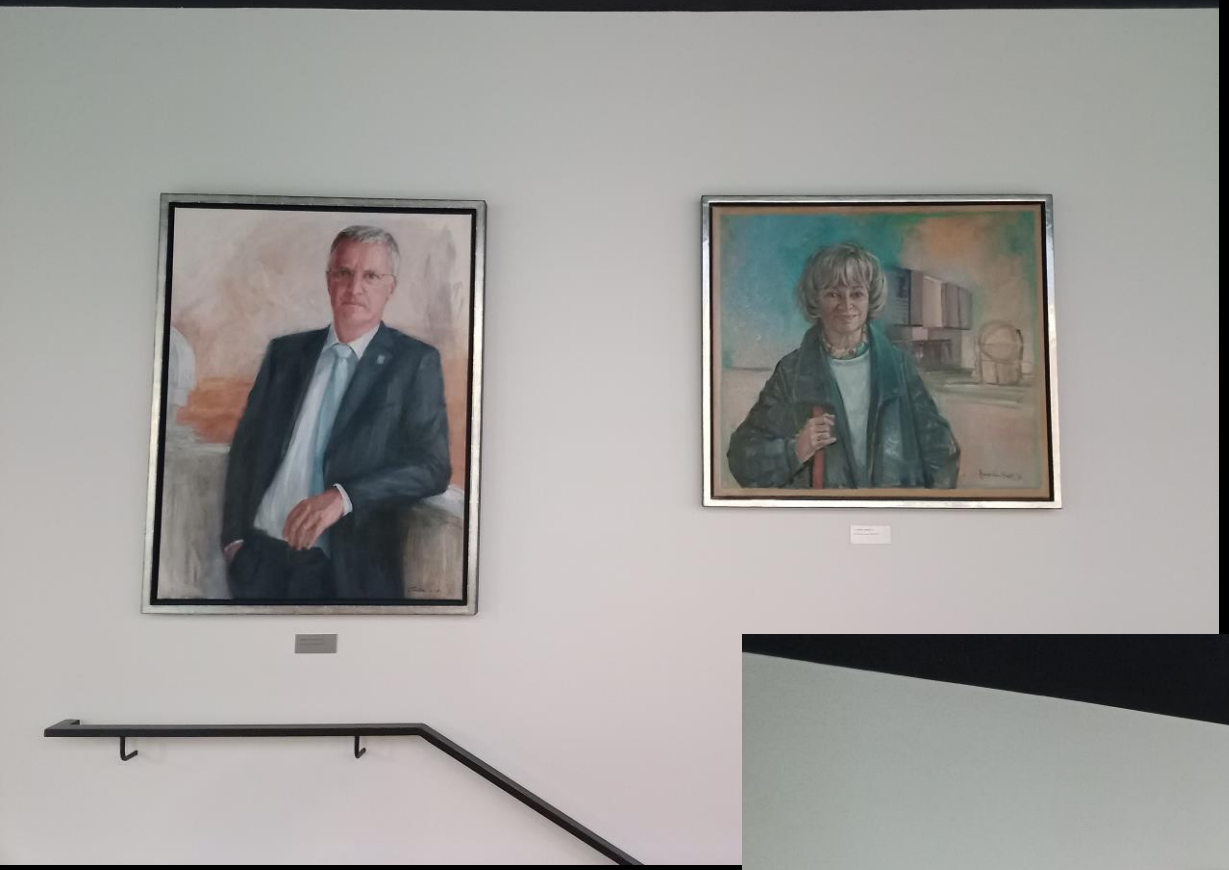

Do not touch please


Do not touch please




President of the Czech Republic and
Ministry of Education, Youth and
Sports (MŠMT)
Czech Republic


SENÁT
PARLAMENTU ČESKÉ REPUBLIKY
SENATE
PARLIAMENT OF THE CZECH REPUBLIC
国家天文台
Senate of the Parliament
of the Czech Republic
Czech Republic

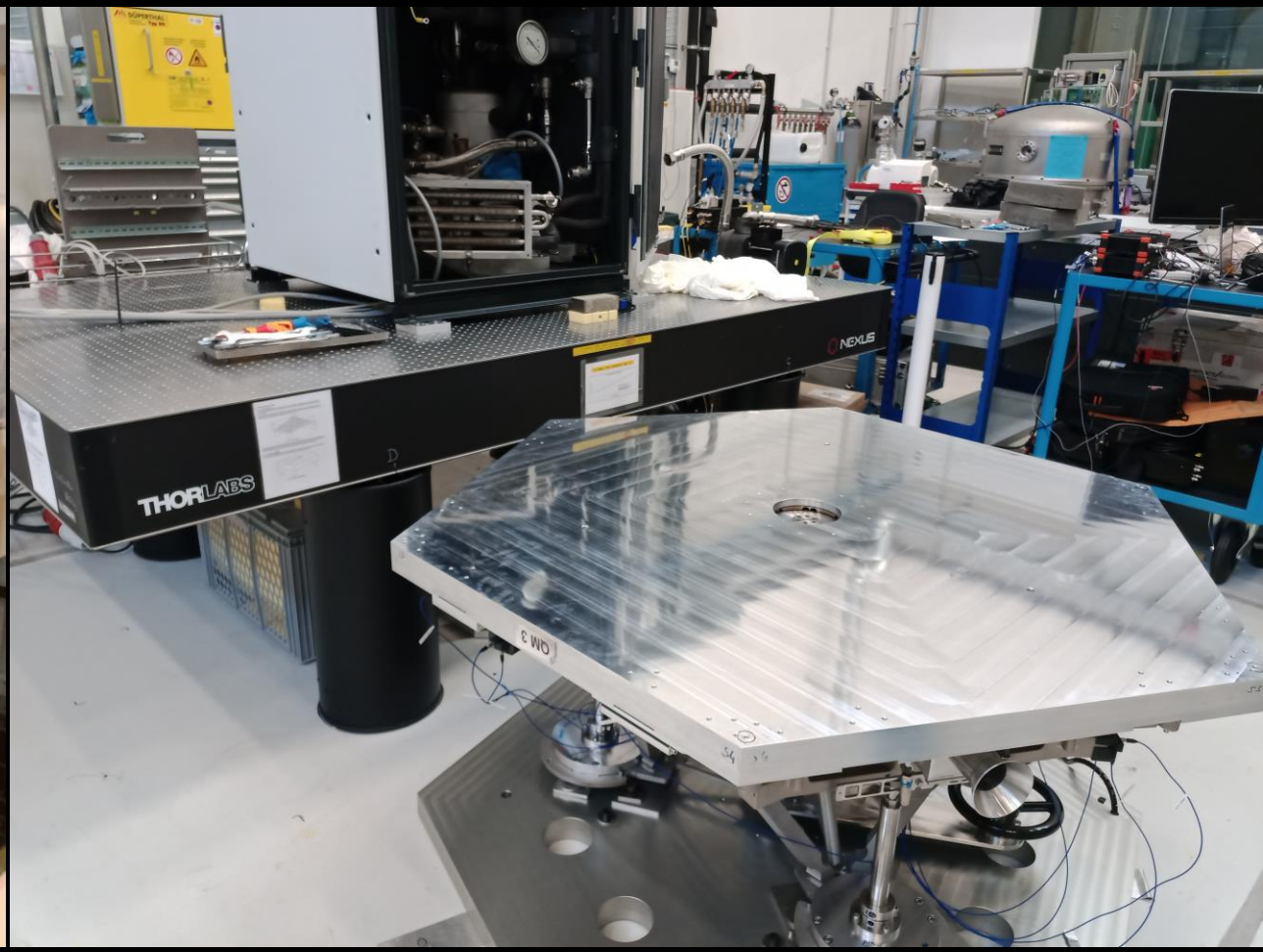



The E-ELT Primary Mirror

ESO library


AUTODOC
Jolanda French
ESO
Karl-Schwarzschild-Straße
85748
Garching bei München
zalando
prime

ESO optical laboratory



ESO regular science meetings

SCAN ME

	Monday	Tuesday	Wednesday	Thursday	Friday	
9:30						
10:00		SPF seminar (online) *bi-weekly				
10:30	Science coffee (old cafeteria)	Science coffee (new cafeteria)	Science coffee (old cafeteria)	Science coffee (new cafeteria)	Science coffee (old cafeteria)	Journal Club (Eridanus)
11:00			Informal discussion (Eridanus)			
11:30					Student and fellows meeting (Eridanus) *bi-weekly	
12:00		Lunch talk (Eridanus)				
12:30						
13:00						
13:30						
14:00						
14:30	Stellar coffee and planetary tea					
15:00	Galaxy evolution coffee *bi-weekly			Joint Astronomy colloquium (Eridanus)		
15:30						
16:00	Student organized session (Eridanus) *bi-weekly		AI Forum (online)			
16:30					Beer Friday	

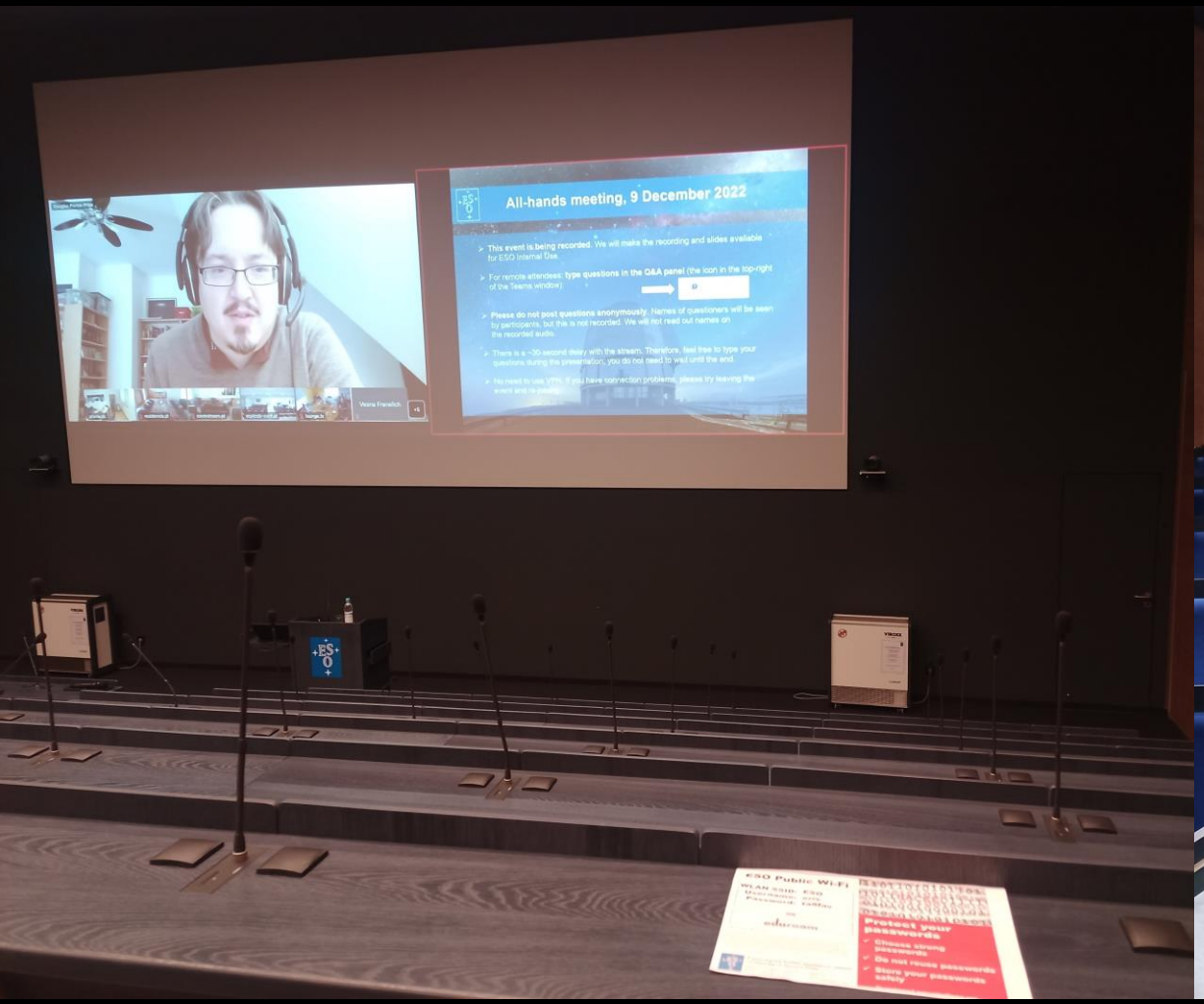
Updated: 22.8.2022

smaller meeting rooms

Student organised session

Informal discussion

Eridanus


All-hands meeting, 9 December 2022
This event is being recorded. We will make the recording and slides available for ESO Internal Use.
For remote attendees: type questions in the Q&A panel (the icon in the top-right of the Teams window).
Please do not post questions anonymously. Names of questioners will be seen by participants, but this is not recorded. We will not read out names on the recorded audio.
There is a ~30-second delay with the stream. Therefore, feel free to type your questions during the presentation, you do not need to wait until the end.
No need to use VPN. If you have connection problems, please try leaving the event and re-joining.
ESO Public Wi-Fi
Protect your passwords
Choose strong passwords
Do not reuse passwords
Store your passwords safely

After arrival

registration in a city hall

appointment at doctor

photo for ESO badge

ESO activities

ESO volleyball

Board game evenings

Winter at ESO

ESO charity group

THE ESO STUDENTS, WITH THE SUPPORT OF THE CHARITY GROUP AND THE ISA, INVITE YOU TO OUR

CHRISTMAS JUMPER CHARITY FUNDRAISER

WEDNESDAY, 14 DECEMBER

START 15:00, NEW CAFETERIA

WEAR YOUR CHRISTMAS JUMPER, OR PUT ON SOME FUN HOLIDAY ACCESSORIES

JOIN THE BAKE SALE

Suggested donation: €5

SUPPORT WINTER AID IN UKRAINE + OTHER CAUSES

WE'RE LOOKING FOR BAKE/CRAFT SALE VOLUNTEERS. WOULD YOU LIKE TO BRING SOMETHING ALONG? PLEASE DROP A LINE: MARU@ESO.ORG

Secret Santa Stealing Game

Snowball fight

ESO Snowman

ESO ski trip to Alpen


Frog'n enk etz
wo'n seids ha?
Es seids sozusagen
auf da Sunnseitn
auf der Holzalm -
schia ha?
Und etz genießts
die Abfahrt
Das Urgestein
Sepp sog: Servus
und
Griaß enk
in Hochfügen
An schian Tog
wünsch i enk!


TERA
TERA

ESO hikes

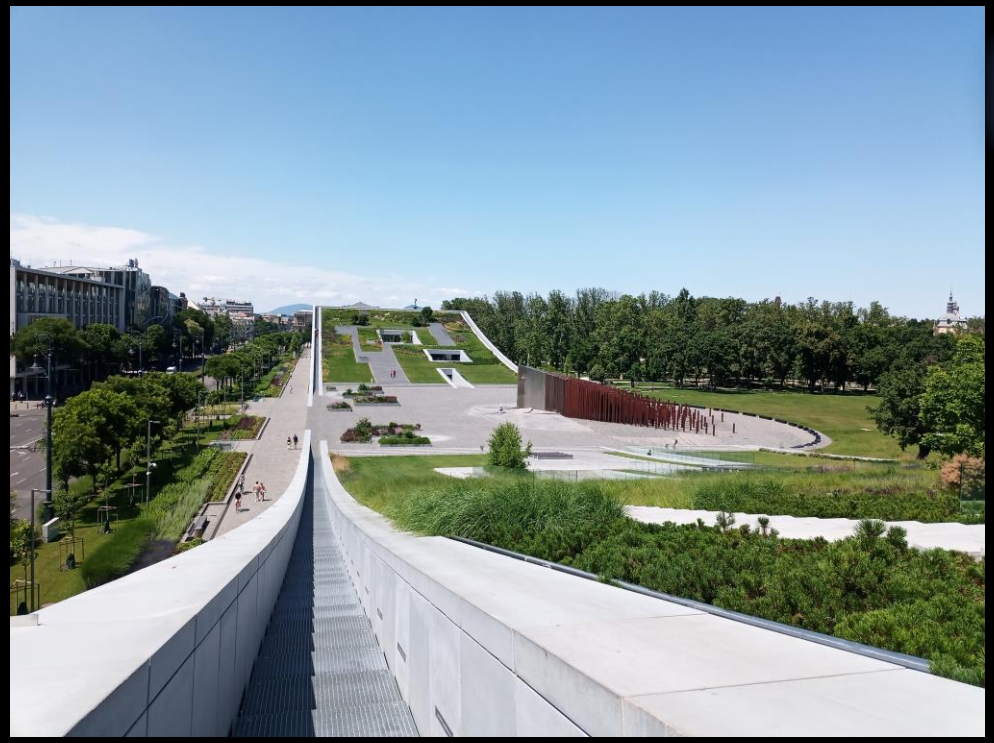

BOGENPARCOURS
Wiegand
Alpine-Coaster
- Sportbahn -
Wiegand
4.

ESO gardening club


Enjoy fresh vegetables
from the local
ESO garden !

Summer at ESO

Interferometric school, Budapešť



Konkoly Observatory

EAS: European Astronomical Society meeting


Restauracja
Bar
Kawiarnia


erc
Work with us!


eas 2023
Kraków
The European Southern Observatory
Bruno Leibundgut
10 July 2023
EAS, Krakow
THANK YOU!


eas 2023
Kraków

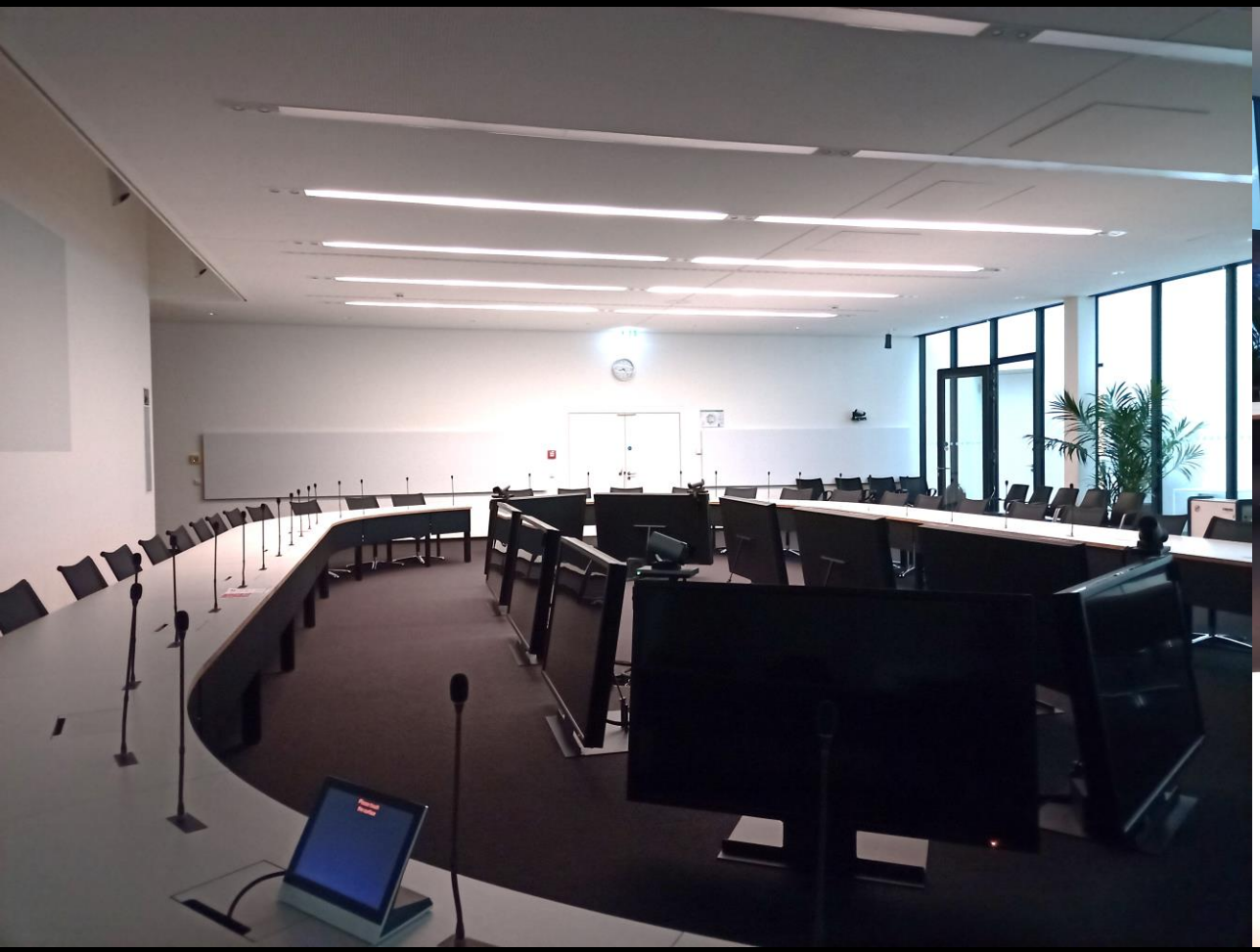
Belgium, Leuven

Hvar stellar meeting

ESO Summer Research Programme

Conferences at ESO

Duties for students



ESO Call for Proposals P114

Proposal Deadline:
21 March 2024, 12:00 noon CET

ESO Call for Proposals P113

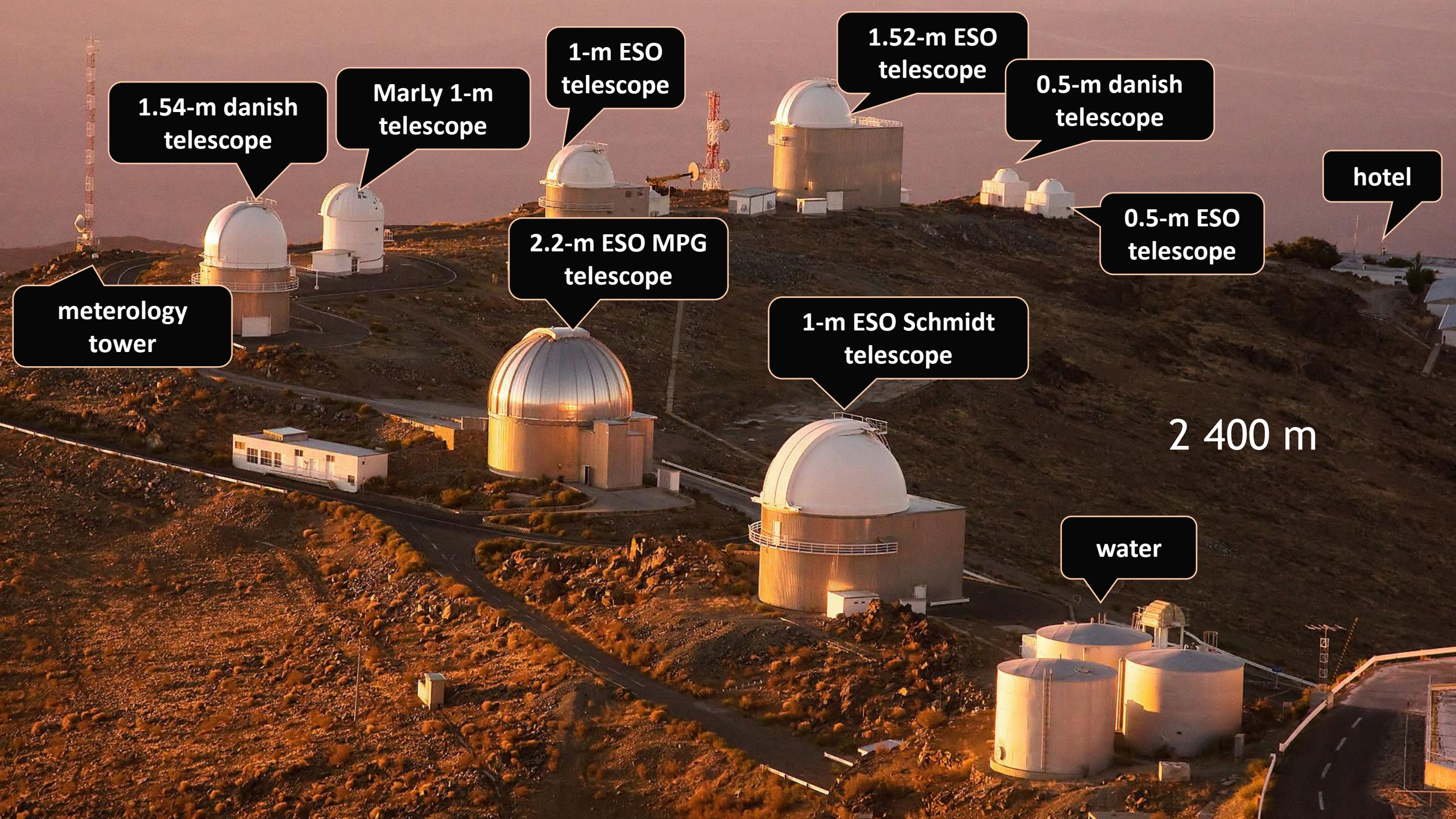
Proposal Deadline:
26 September 2023, 12:00 noon CEST

November 1976 – first light

first ESO observatory

La Silla

HARPS – the best instrument for searching exoplanets

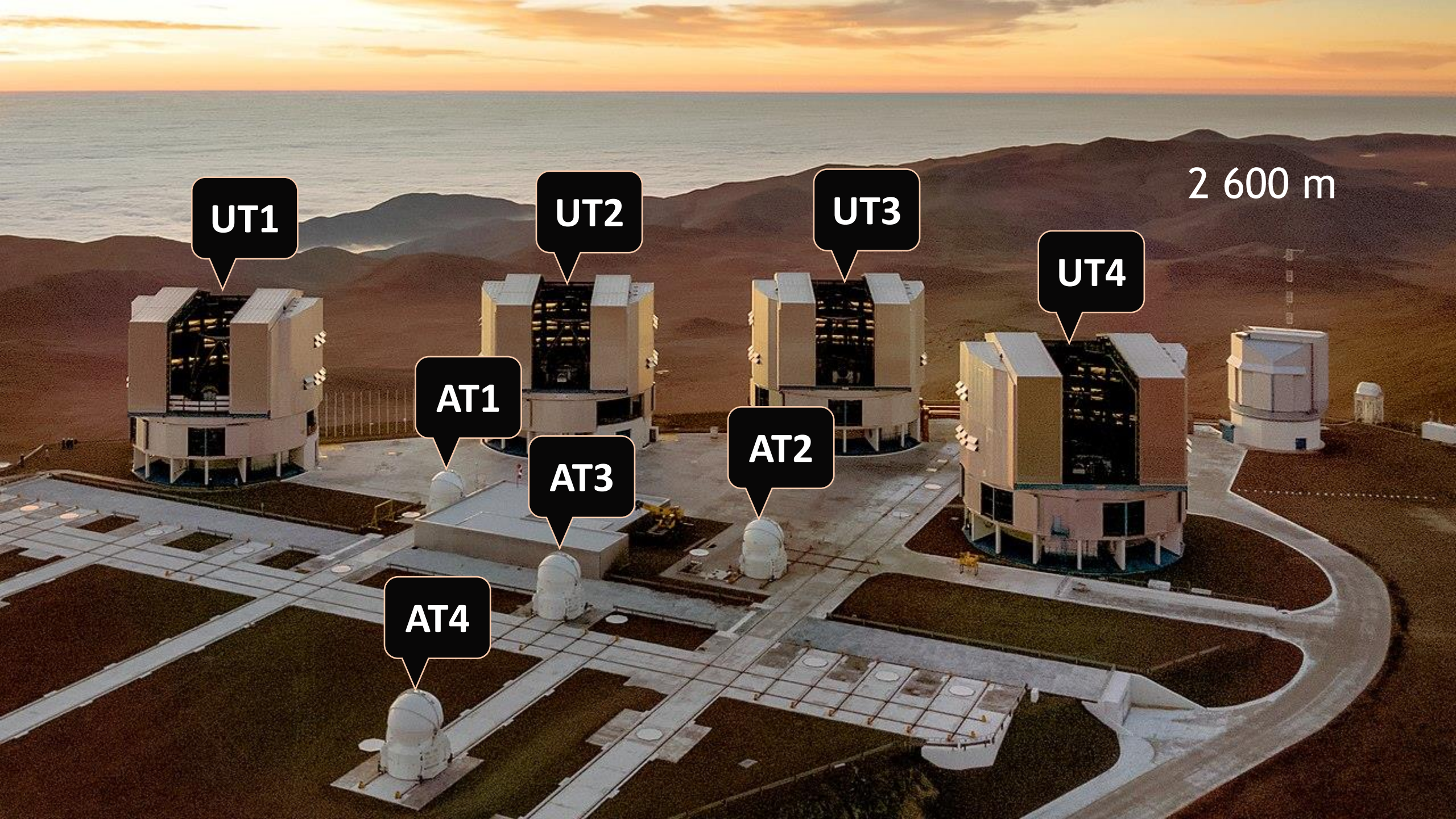

1.54-m danish telescope
MarLy 1-m telescope
1-m ESO telescope
1.52-m ESO telescope
0.5-m danish telescope
hotel
0.5-m ESO telescope
meterology tower
2.2-m ESO MPG telescope
1-m ESO Schmidt telescope
2 400 m
water

Very Large Telescope (VLT)

Paranal

the first image of an exoplanet

May 1998 – first light


UT1
UT2
UT3
UT4
AT1
AT2
AT3
AT4
2 600 m

ALMA - Atacama Large Millimeter / submillimeter Array

Chajnantor

October 2011 – first light

66 radio-telescopes


5 000 m

Evaluation of ESO proposals

students can be scientific assistants for evaluation panels

hearing what the panel likes and dislike

Celebrations of progresses about ELT

Extremely Large Telescope (ELT)

39-m primary mirror from 798 hexagonal segments + other 4 mirrors

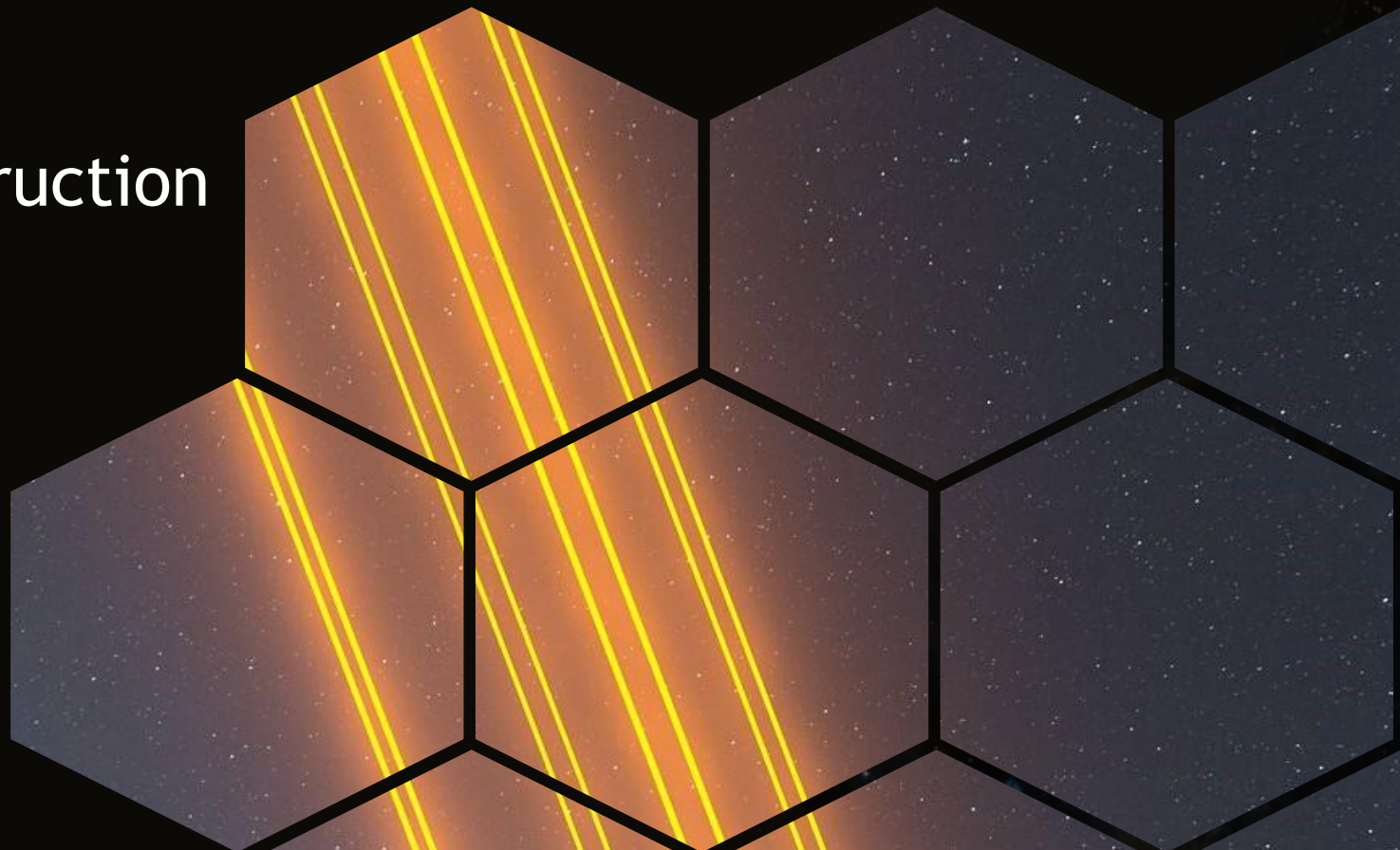
2005 – first plans

2014 – construction approval

2017 – beginning of the construction

2024:

Webcam from September



2028 – planned start

Instruments:

HARMONI

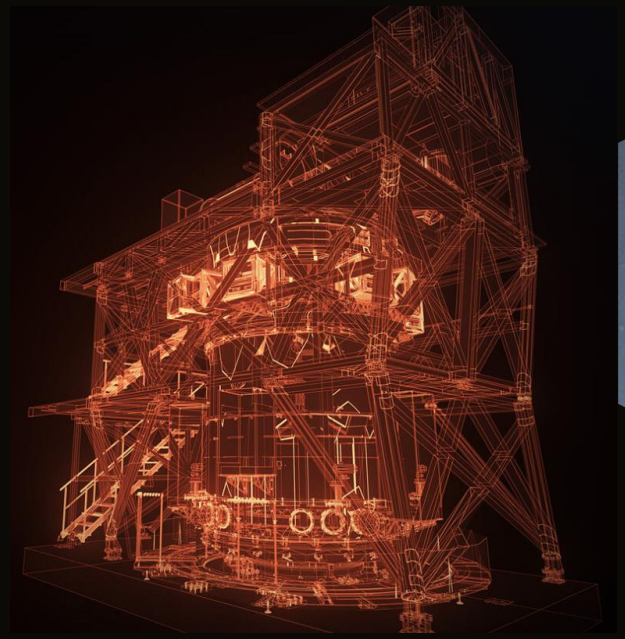
MICADO

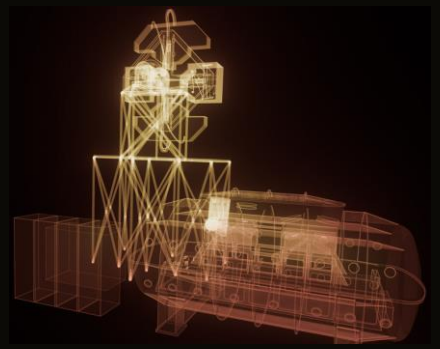
MORFEO

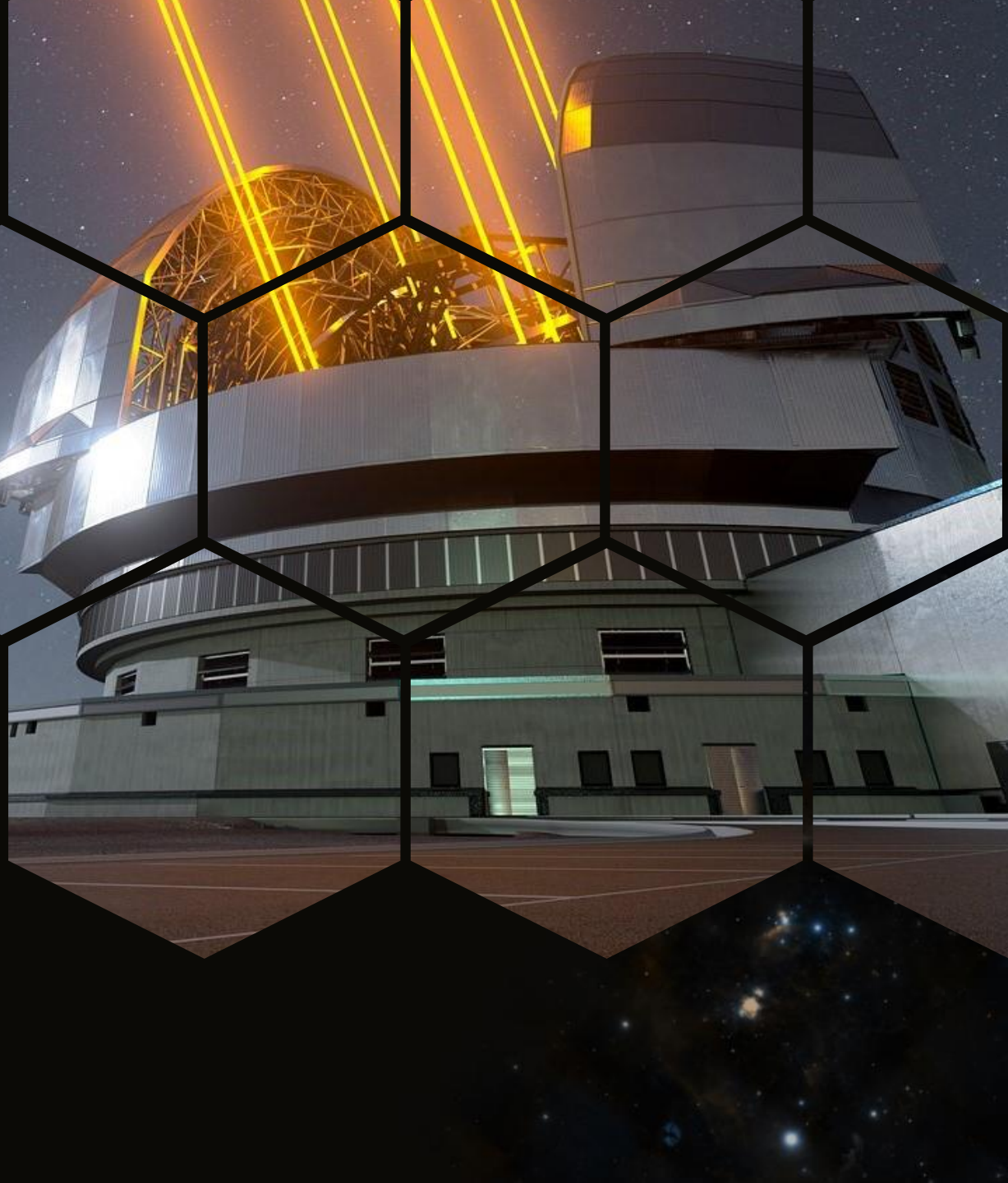
METIS

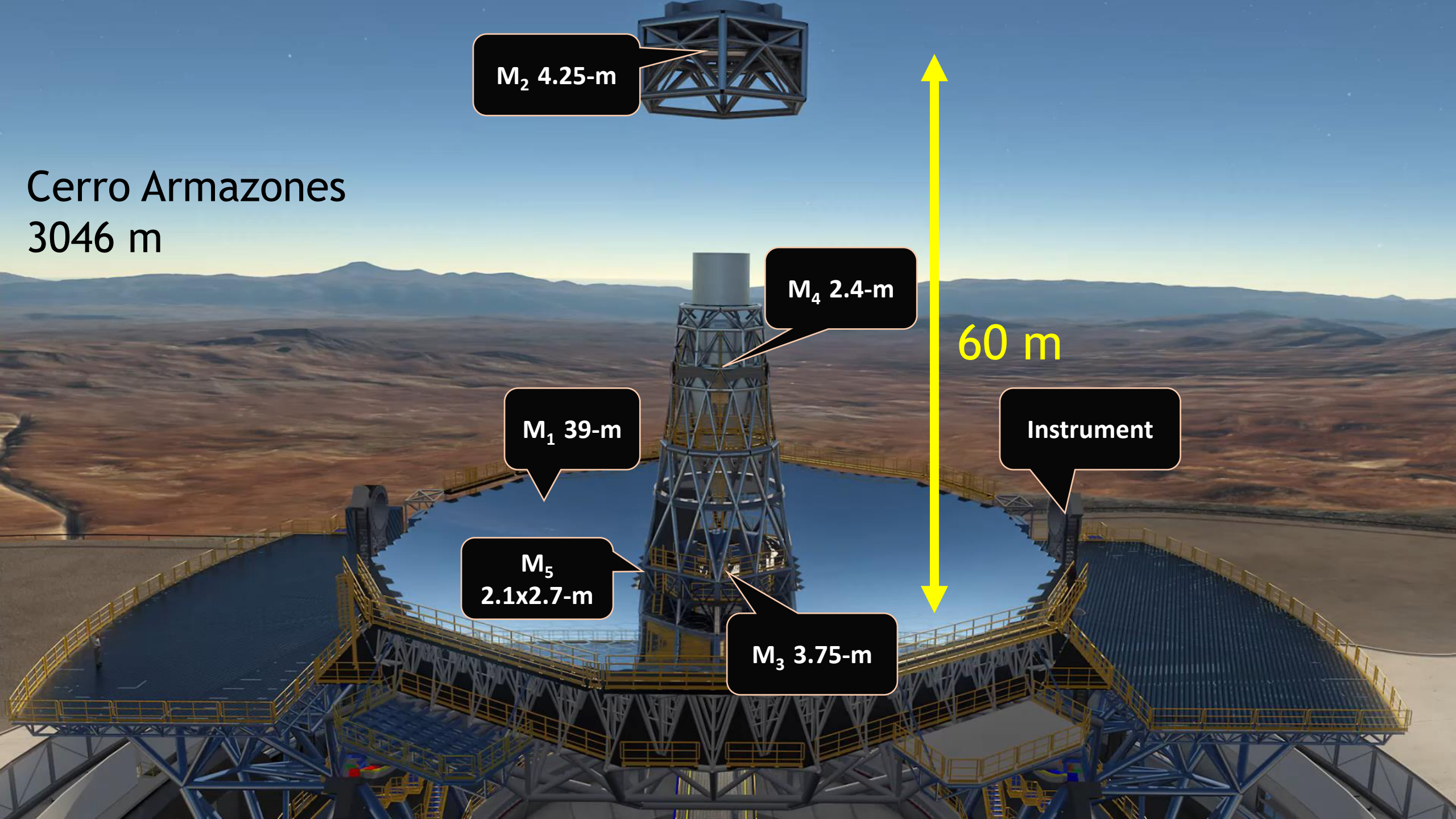
MOSAIC

ANDES – ČR involvement

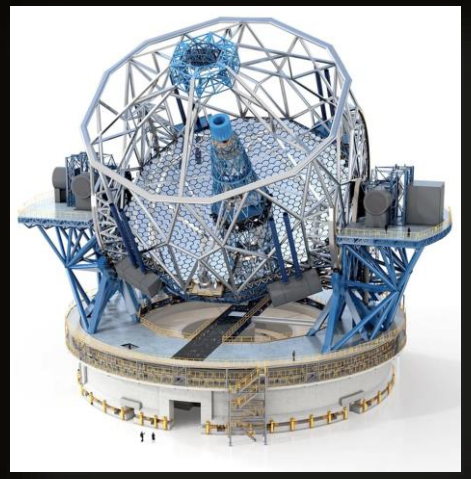




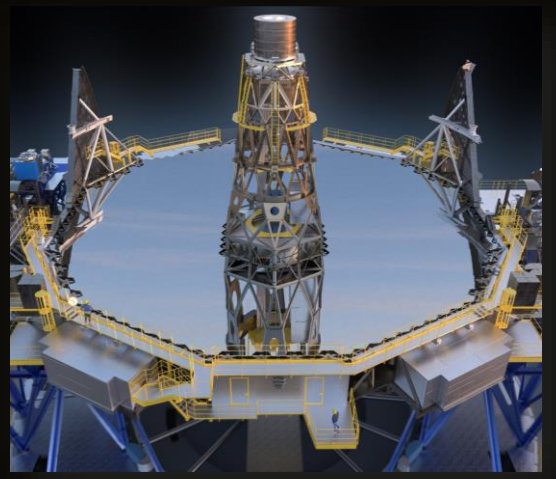



M_2 4.25-m
Cerro Armazones
3046 m
M_4 2.4-m
60 m
M_1 39-m
Instrument
M_5
2.1x2.7-m
M_3 3.75-m

ELT: plans



finishing the construction of a telescope



installing of segments of M_1

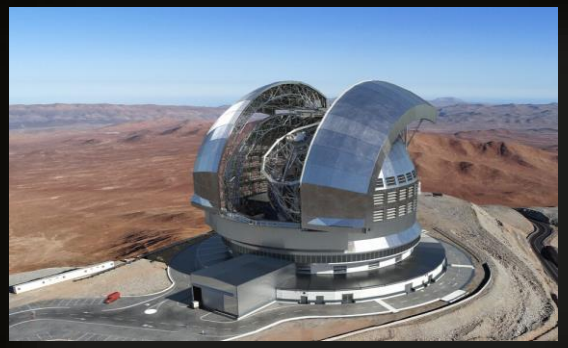
2025

2026

2027

finishing mirror M_2

finishing the dom



finishing mirrors M_3, M_4, M_5

first light

stars

Solar System

unexpected phenomena

fundamental physics

cosmology and dark metter

2028

2029

first observations, tests

proposals for observations

exoplanets

galaxies

black holes

Supernova


Exoplaneten
Exoplanets
5
Sind wir allein?
Kepler-186f
WHERE THE GRASS IS ALWAYS REDDER ON THE OTHER SID

TUM: Technical University of Munich

Max Planck Institute

Garchinger See

Cycling routes

Munich


Margot Robbie
Ryan Gosling
Sie ist alles. Er ist nur Ken.
Barbie
Ab 20. Juli nur im Kino
DOLBY ATMOS
HOTEL
COFFEE FELLOWS

English Garden

Social day

October fest

Halloween party

Farwell presents

Farewell parties

Orion belt

brightest members of Orion OB1 association

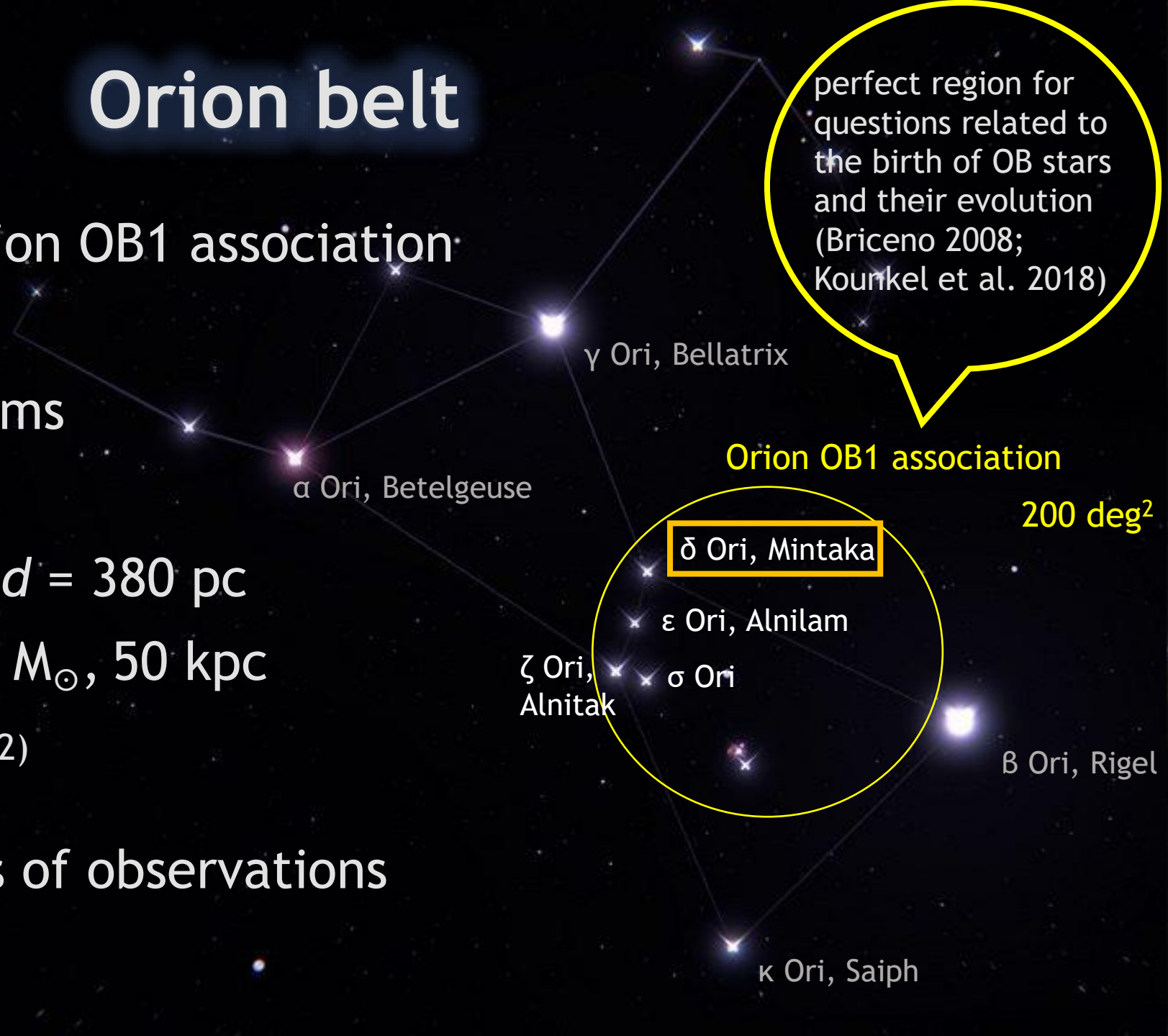
our closest massive systems

interferometry possible, d = 380 pc

vs. BAT99-98 in LMC, 226 $M_\odot$, 50 kpc

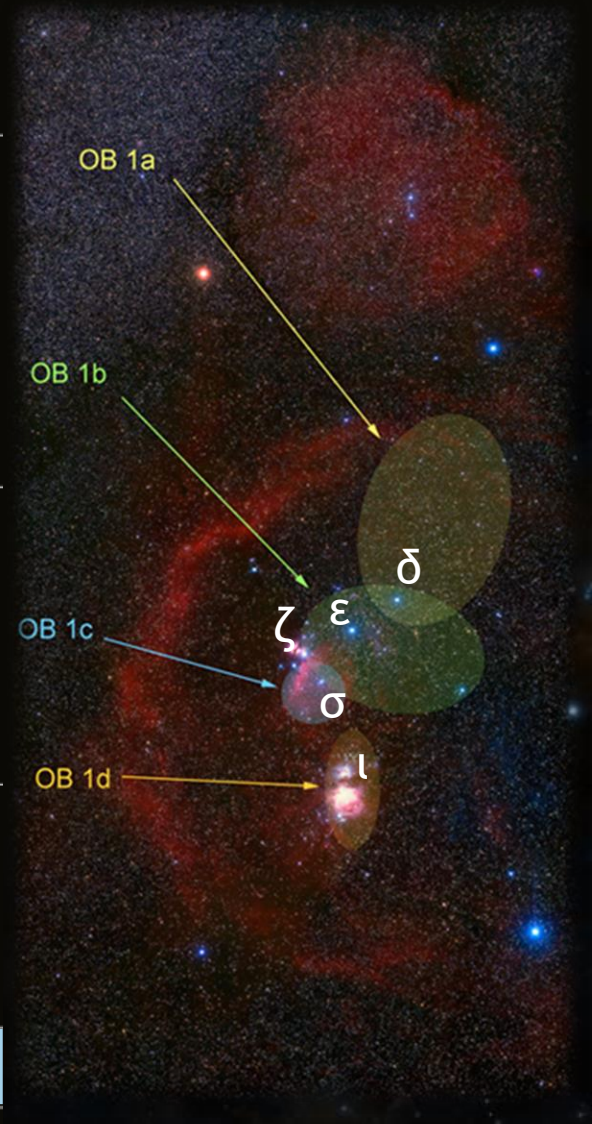
(Heinich et al. 2014; Kalari et al. 2022)

→ analyses with all kinds of observations

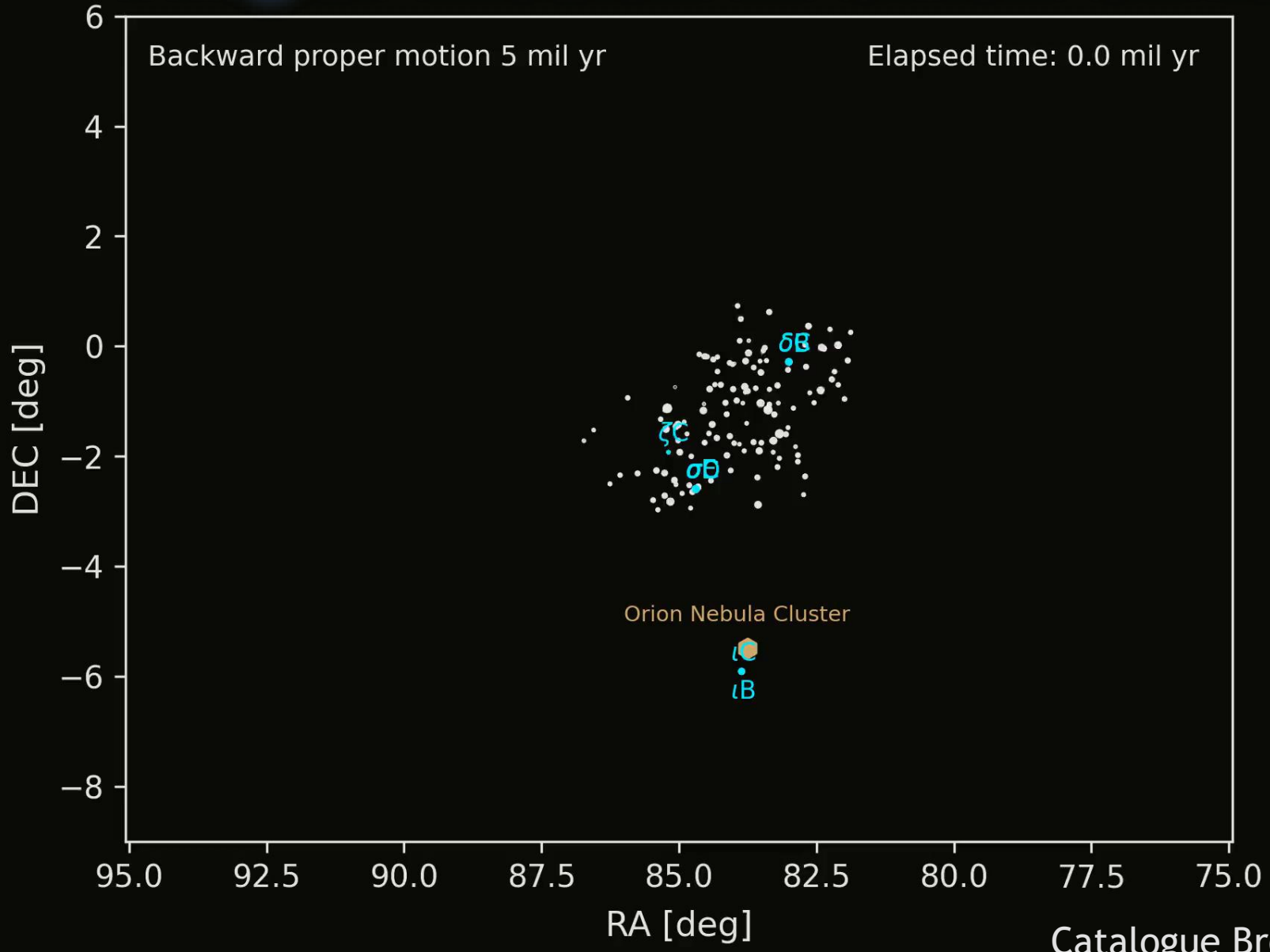


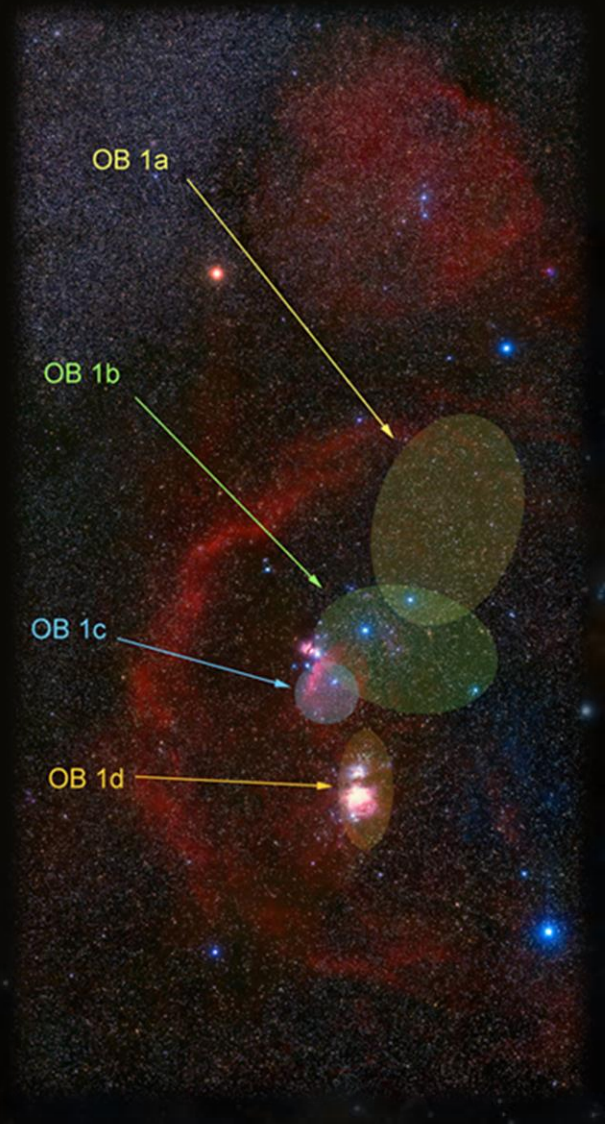
Orion association

HD	Name	V [mag]	Spectral type	Gaia DR3 parallax	Separation, notes
36486 Aa1	δ Ori Aa1	2.55	O9.5 II		
36486 Aa2	δ Ori Aa2	5.5?	B2 V		0.00052″ from Aa1
36486 Ab	δ Ori Ab	3.83	B0 IV		0.32″
36486 B	δ Ori B	14.0	K?	3.5002 ± 0.0119	33″
36485 Ca	δ Ori Ca	6.62	B3 V	2.6244 ± 0.0538	52″, helium star
36485 Cb	δ Ori Cb	9.8?	A0 V		0.0012″ from Ca
37468 Aa	σ Ori Aa	4.61	O9.5 V		
37468 Ab	σ Ori Ab	5.20	B0.5 V		0.00042″
37468 B	σ Ori B	5.31	B?		0.25″
37468 C	σ Ori C	8.79	B0.5 V	2.4720 ± 0.0292	11″
37468 D	σ Ori D	6.62	B2 V	2.4744 ± 0.0621	13″
37468 E	σ Ori E	6.66	B2 V	2.3077 ± 0.0646	42″, helium star
37043 Aa1	ι Ori Aa1	2.8?	O8.5 III		
37043 Aa2	ι Ori Aa2		B0.8 III		0.0015″, eccentric
37043 Ab	ι Ori Ab		B2 IV		0.15″
37043 B	ι Ori B	7.00	B8 III	2.7869 ± 0.0476	11″
37043 C	ι Ori C	9.76	A0 V	2.6057 ± 0.0241	49″
37742 Aa	ζ Ori Aa	2.1	O9.5 Ib		
37742 Ab	ζ Ori Ab	4.3	B0.5 IV		0.042″
37743	ζ Ori B	4.0	B0 III		2.4″
37742 C	ζ Ori C	9.54	A?	2.5876 ± 0.0387	57″
37128	ε Ori	1.68	B0 Ia		OB1b, single, variable 0.05 mag



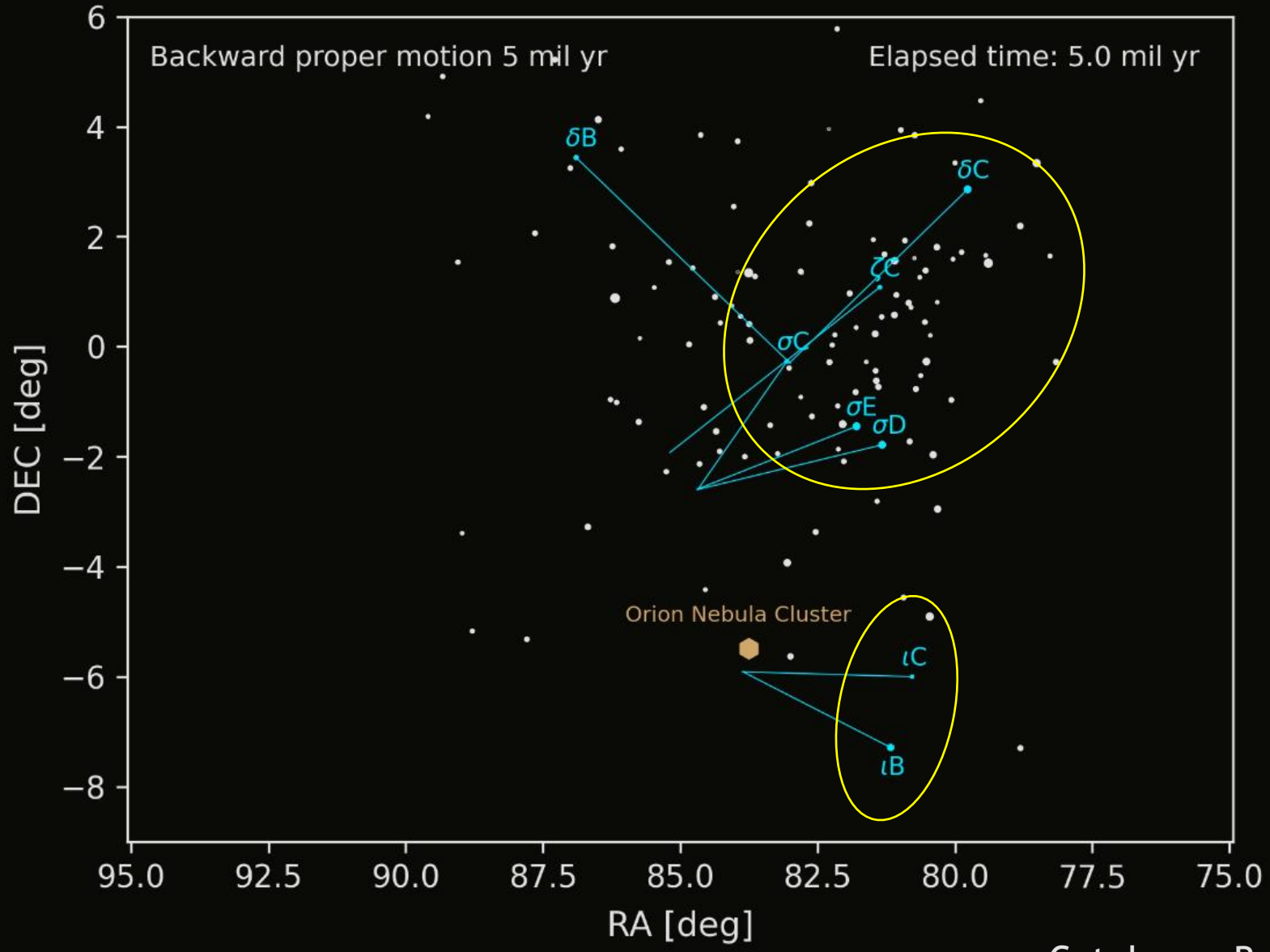
Proper motion in Orion OB1b association

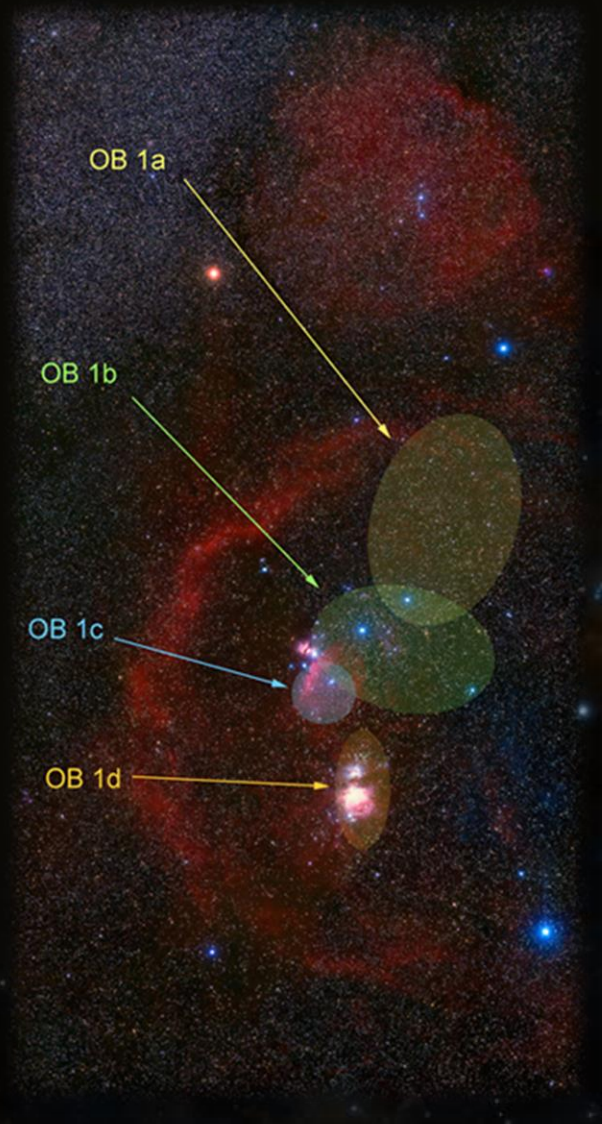




Catalogue Brown, 1994

Proper motion in Orion OB1b association





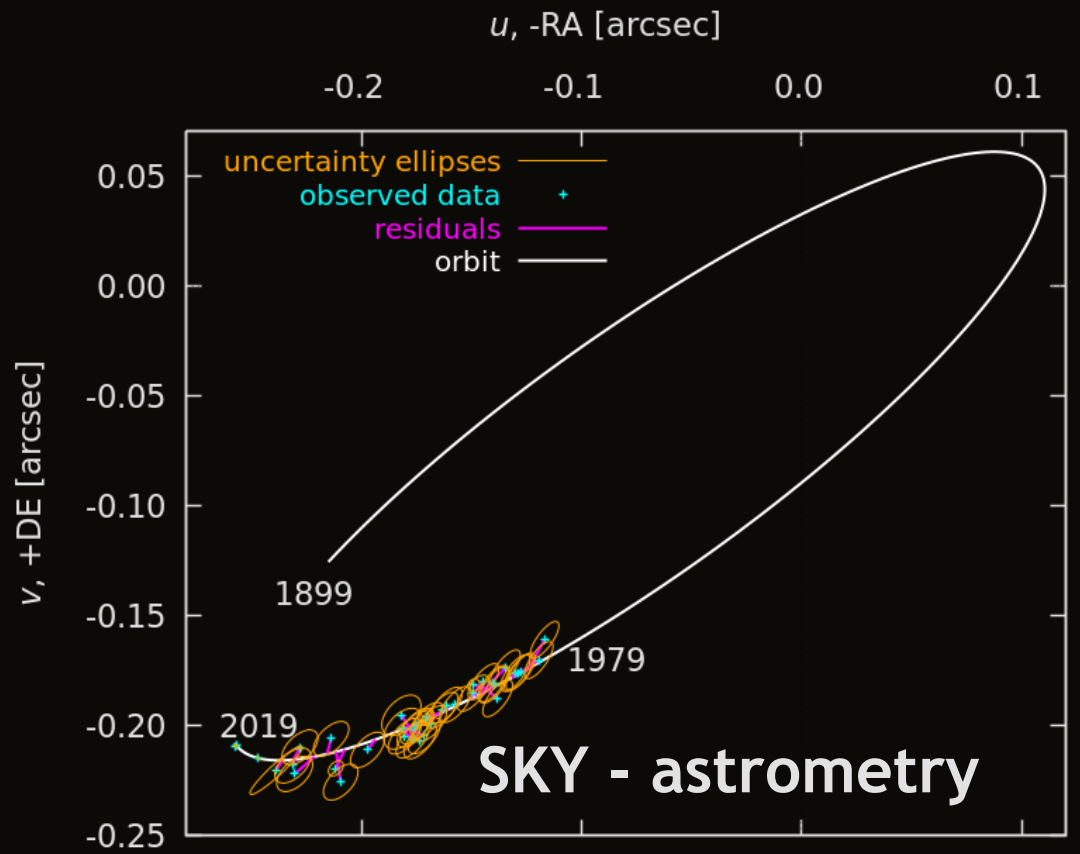
Catalogue Brown, 1994

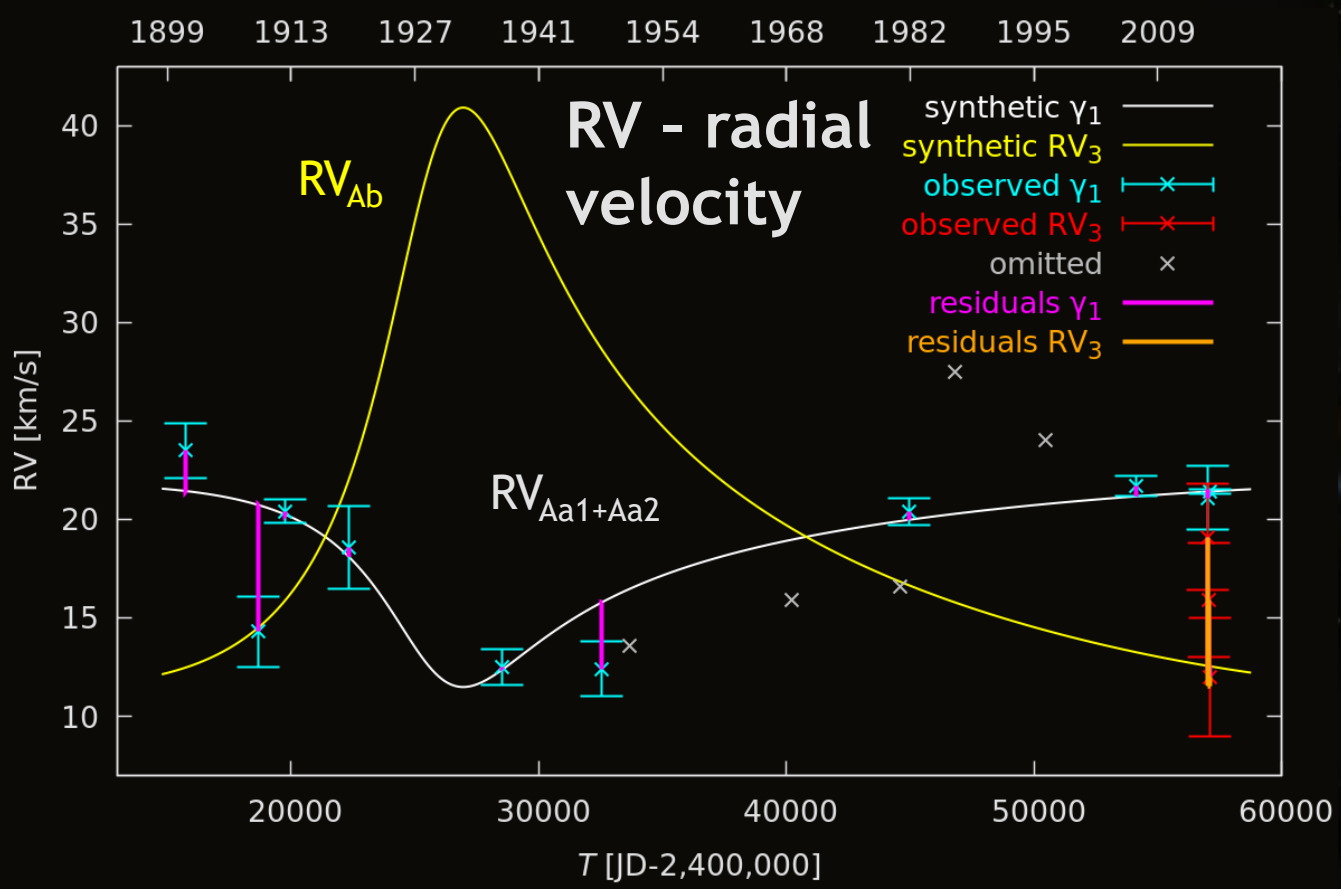
3-body model in Xitau

$$\vec{f}_i = \sum_{j \neq i} \frac{G m_j}{r_{ij}^3} \vec{r}_{ij} + \vec{f}_{\text{oblat}} + \vec{f}_{\text{ppn}} \quad \text{for } \forall\, i$$

Brož et al. 2017, 2021, 2022a,b

$$\chi^2 = w_{\text{SKY}}\chi^2_{\text{SKY}} + w_{\text{RV}}\chi^2_{\text{RV}} + w_{\text{ETV}}\chi^2_{\text{ETV}} + w_{\text{ECL}}\chi^2_{\text{ECL}} + w_{\text{LC}}\chi^2_{\text{LC}} + w_{\text{SYN}}\chi^2_{\text{SYN}} + w_{\text{SED}}\chi^2_{\text{SED}}$$





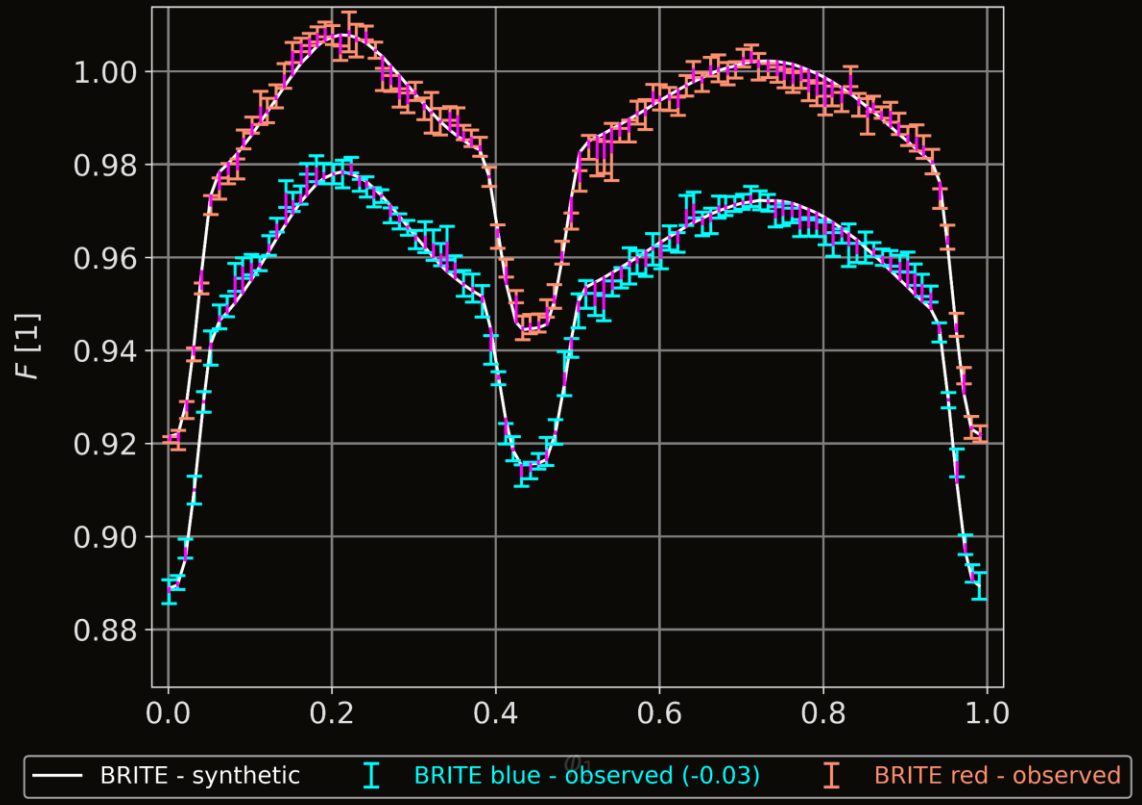
3-body model in Xitau

$$\vec{f}_i = \sum_{j \neq i} \frac{G m_j}{r_{ij}^3} \vec{r}_{ij} + \vec{f}_{\text{oblat}} + \vec{f}_{\text{ppn}} \quad \text{for } \forall\, i$$

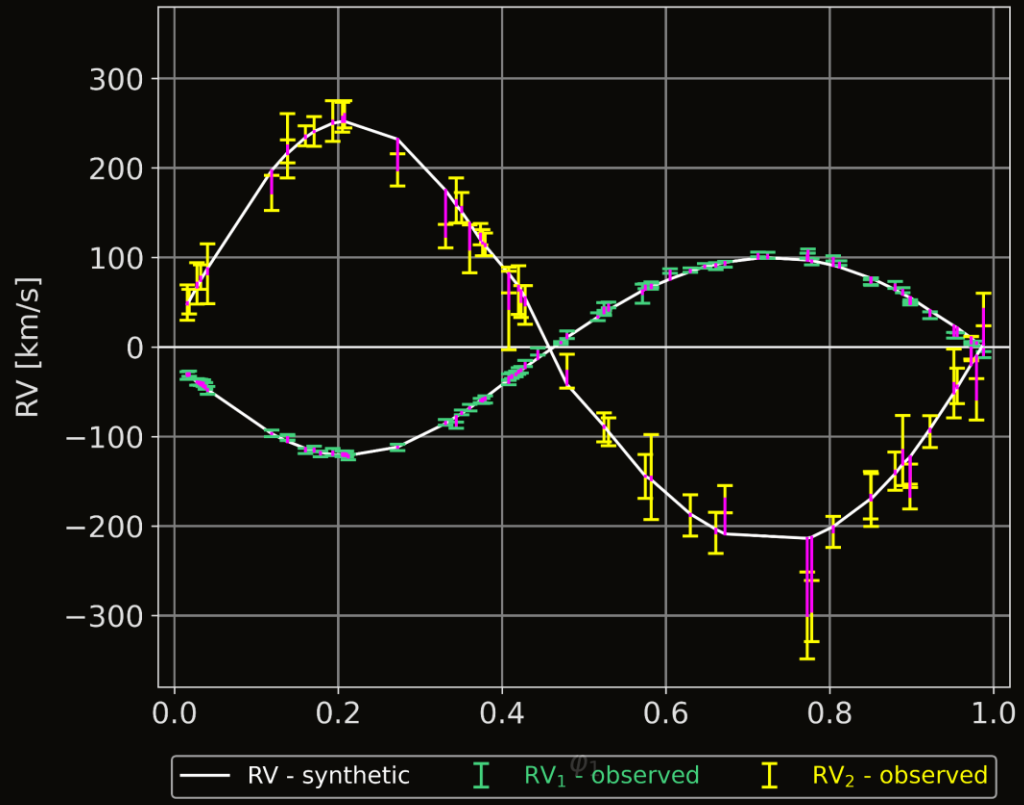
Brož et al. 2017, 2021, 2022a,b

$$\chi^2 = w_{\text{SKY}}\chi^2_{\text{SKY}} + w_{\text{RV}}\chi^2_{\text{RV}} + w_{\text{ETV}}\chi^2_{\text{ETV}} + w_{\text{ECL}}\chi^2_{\text{ECL}} + w_{\text{LC}}\chi^2_{\text{LC}} + w_{\text{SYN}}\chi^2_{\text{SYN}} + w_{\text{SED}}\chi^2_{\text{SED}}$$

LC - BRITE light curves



RV - radial velocities



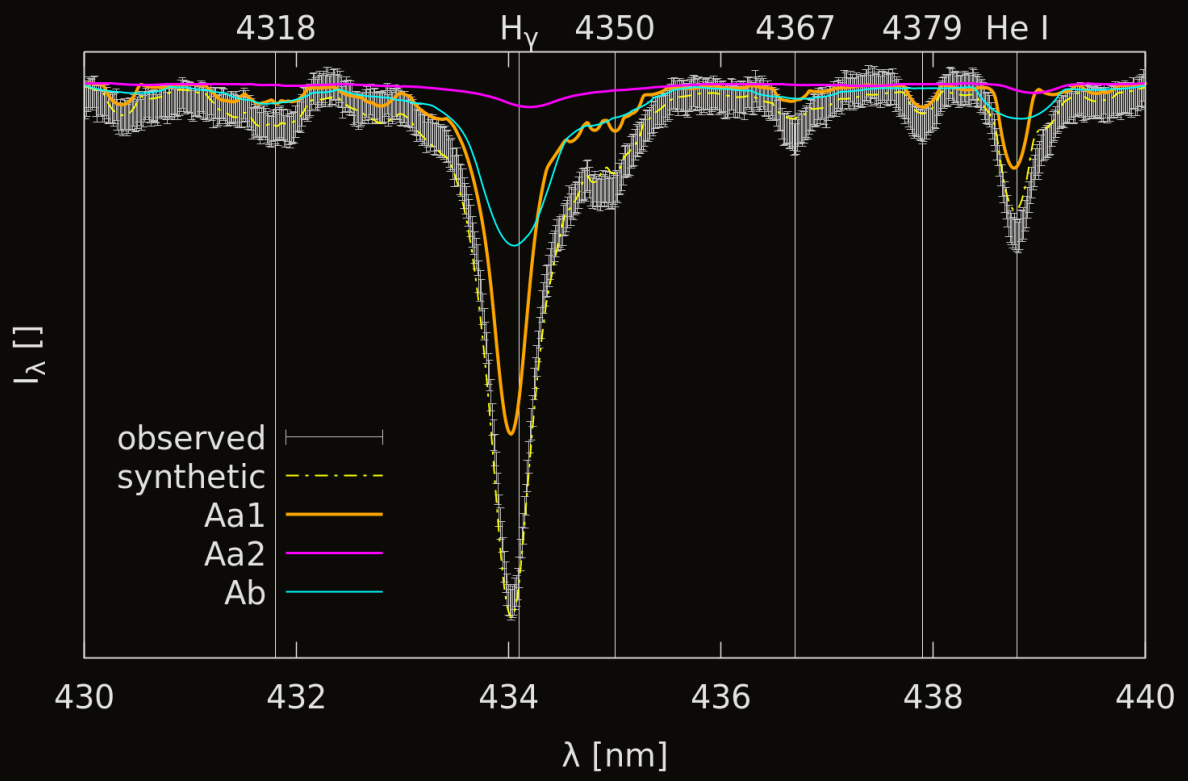
3-body model in Xitau

$$\vec{f}_i = \sum_{j \neq i} \frac{G m_j}{r_{ij}^3} \vec{r}_{ij} + \vec{f}_{\text{oblat}} + \vec{f}_{\text{ppn}} \quad \text{for } \forall\, i$$

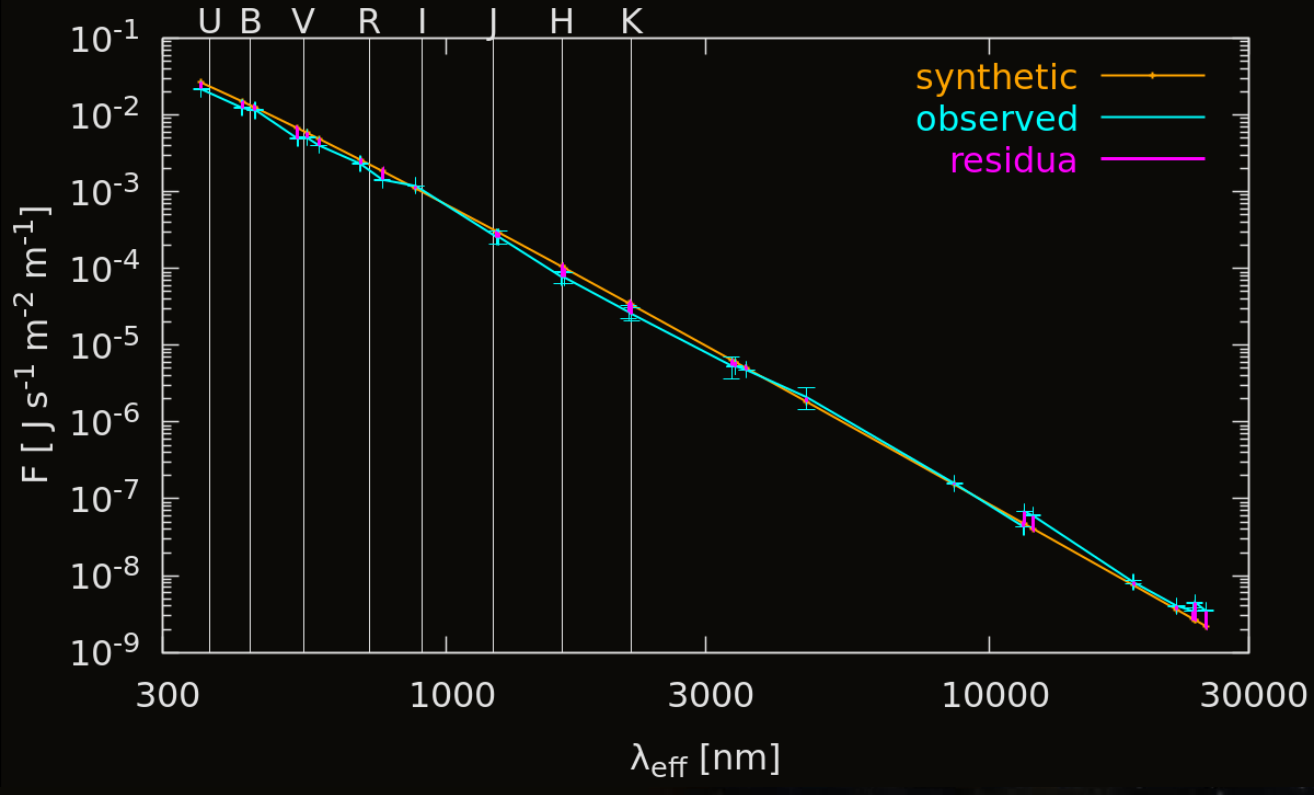
Brož et al. 2017, 2021, 2022a,b

$$\chi^2 = w_{\text{SKY}}\chi^2_{\text{SKY}} + w_{\text{RV}}\chi^2_{\text{RV}} + w_{\text{ETV}}\chi^2_{\text{ETV}} + w_{\text{ECL}}\chi^2_{\text{ECL}} + w_{\text{LC}}\chi^2_{\text{LC}} + w_{\text{SYN}}\chi^2_{\text{SYN}} + w_{\text{SED}}\chi^2_{\text{SED}}$$

spectra

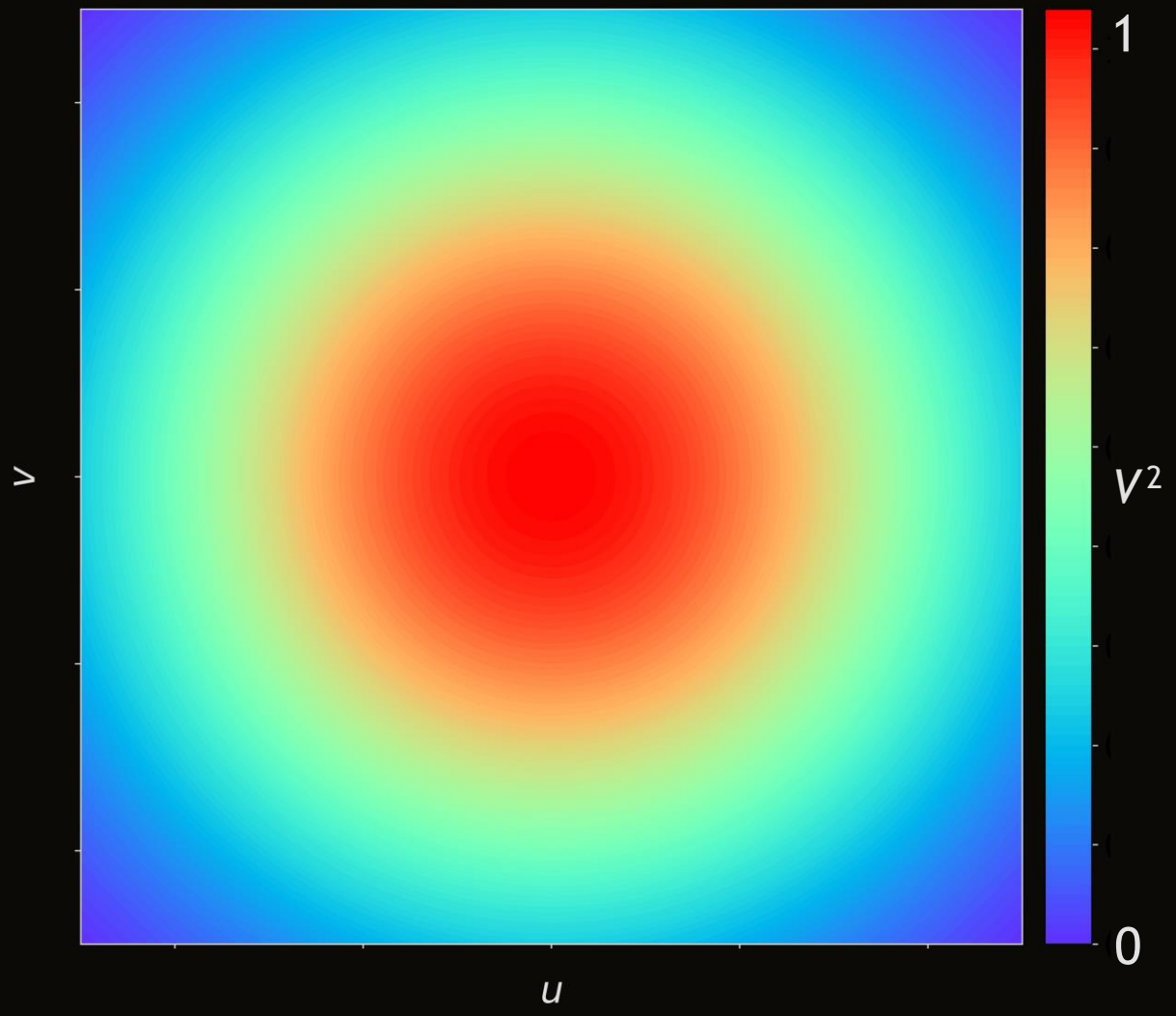


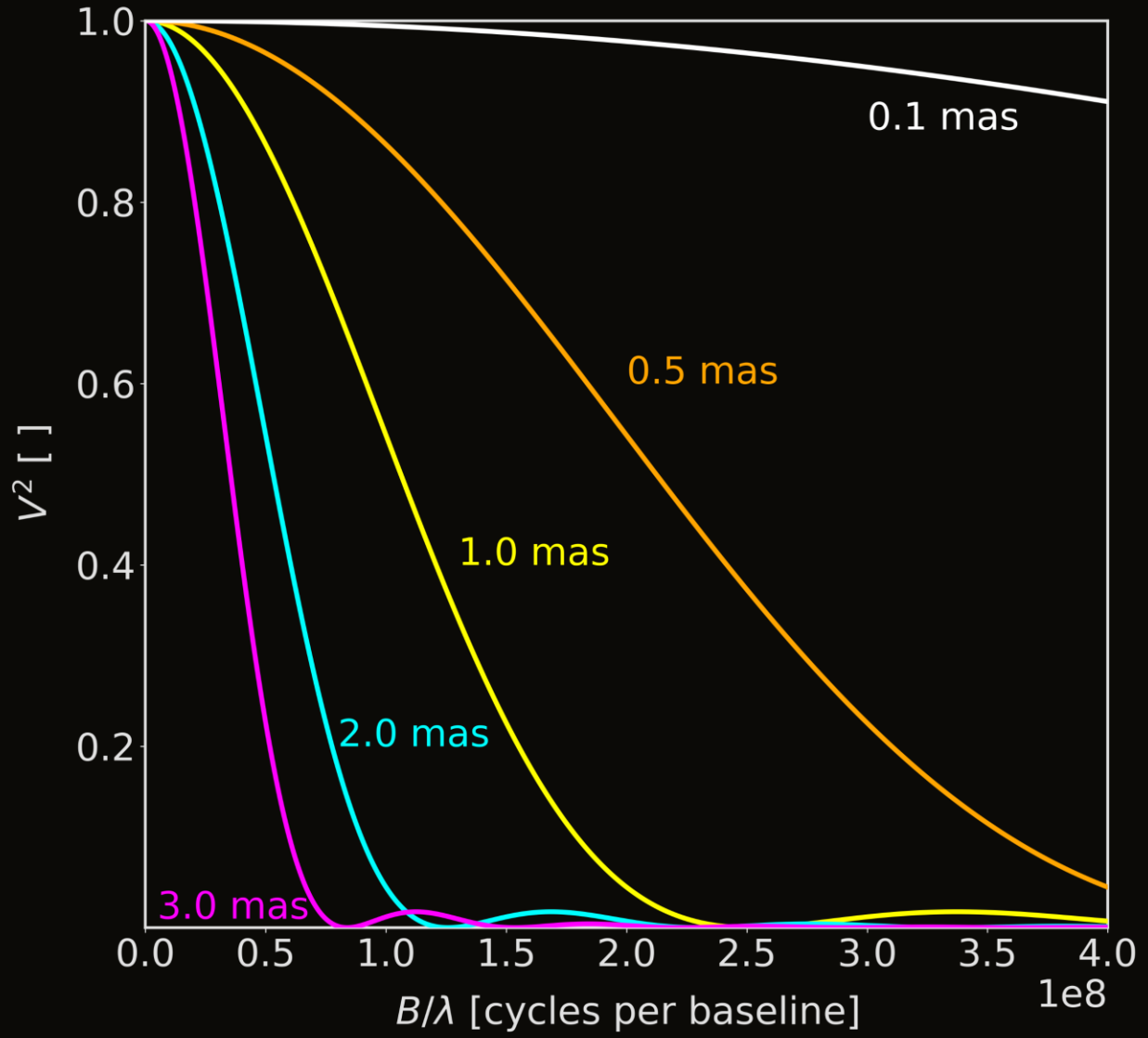
SED



Bessel function for uniform disk

$$\mu(u,v) = \frac{2J_1(\pi\theta\sqrt{u^2+v^2})}{\pi\theta\sqrt{u^2+v^2}}$$





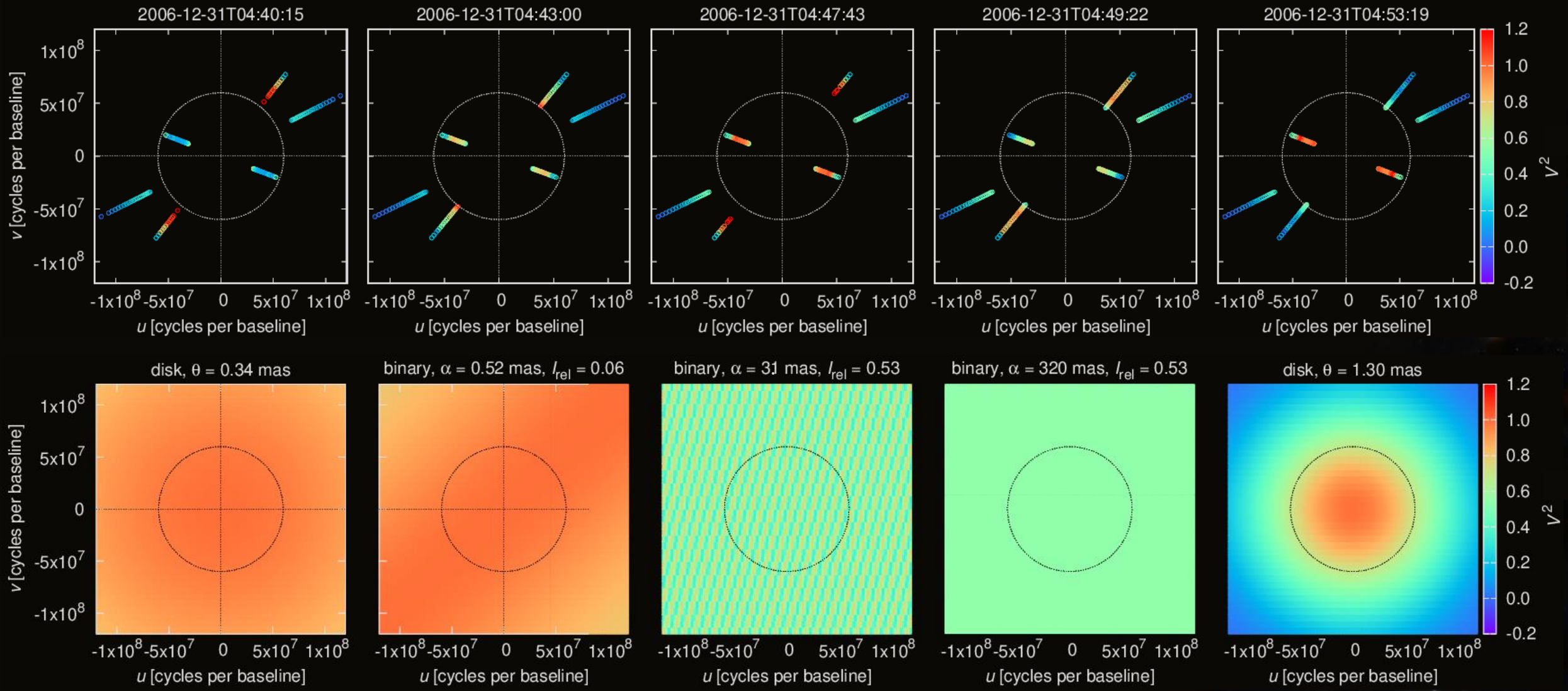
Old data from VLTI/AMBER

angular scale: 1.3 mas (same as Shabun 2008)

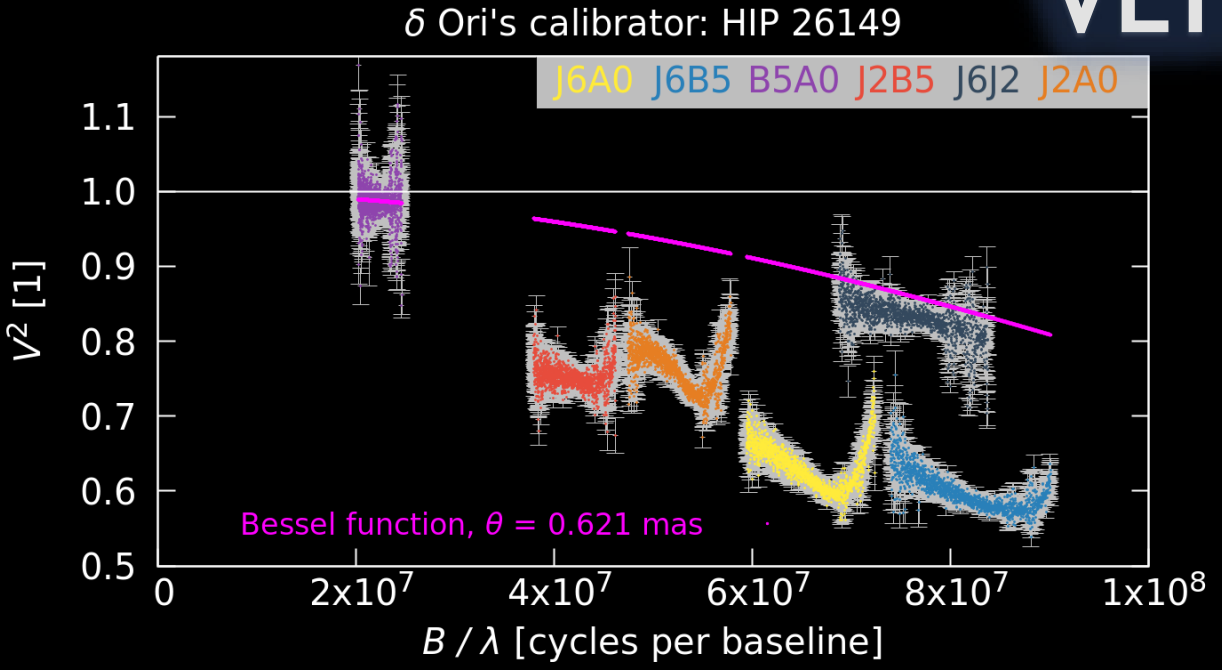
Aa1 0.34 mas
Aa2 0.03 mas
Ab 0.24 mas

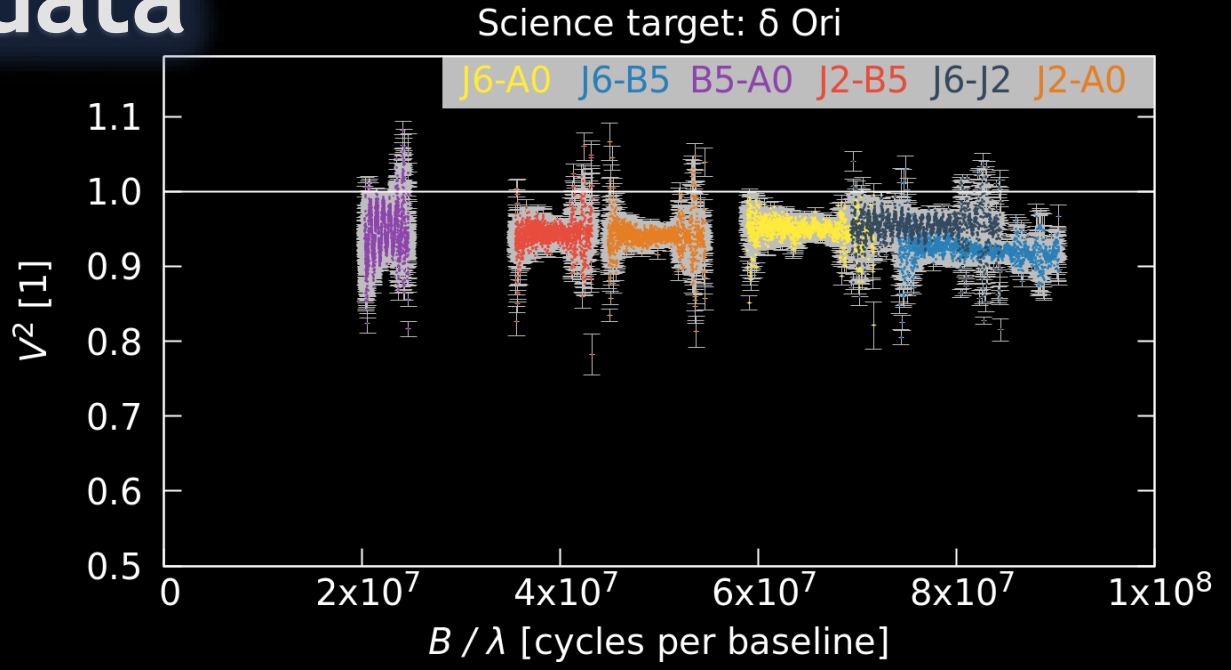
ρ = 0.52 mas

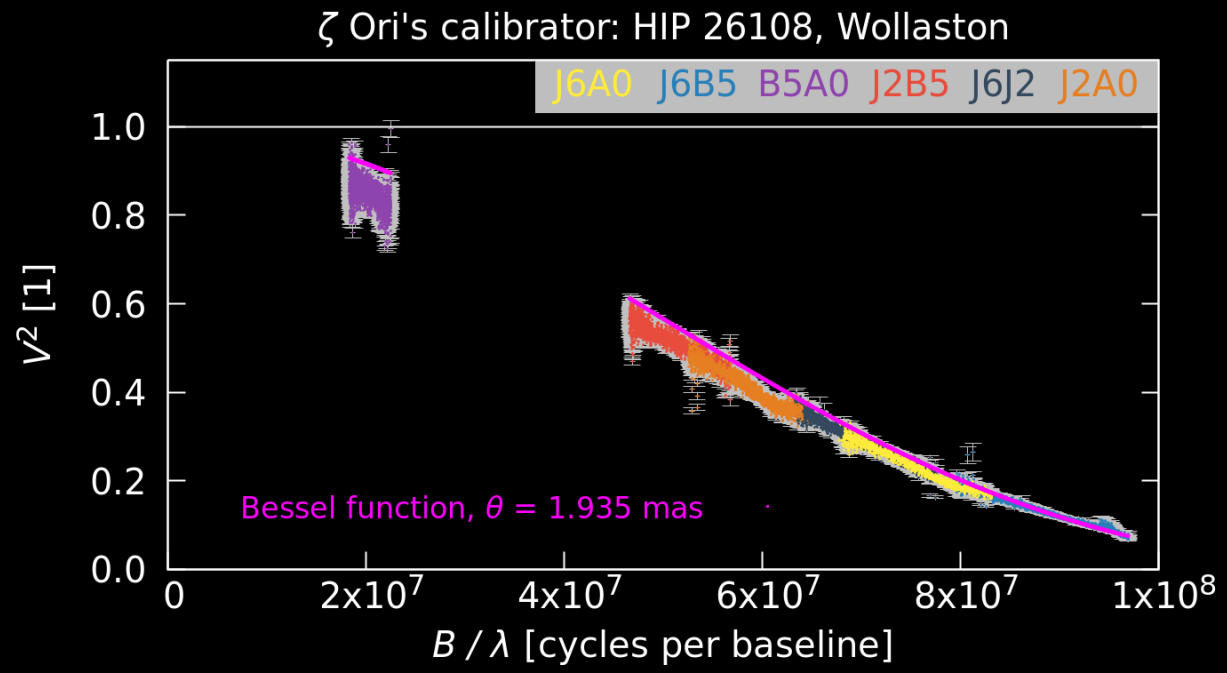
ρ = 320 mas

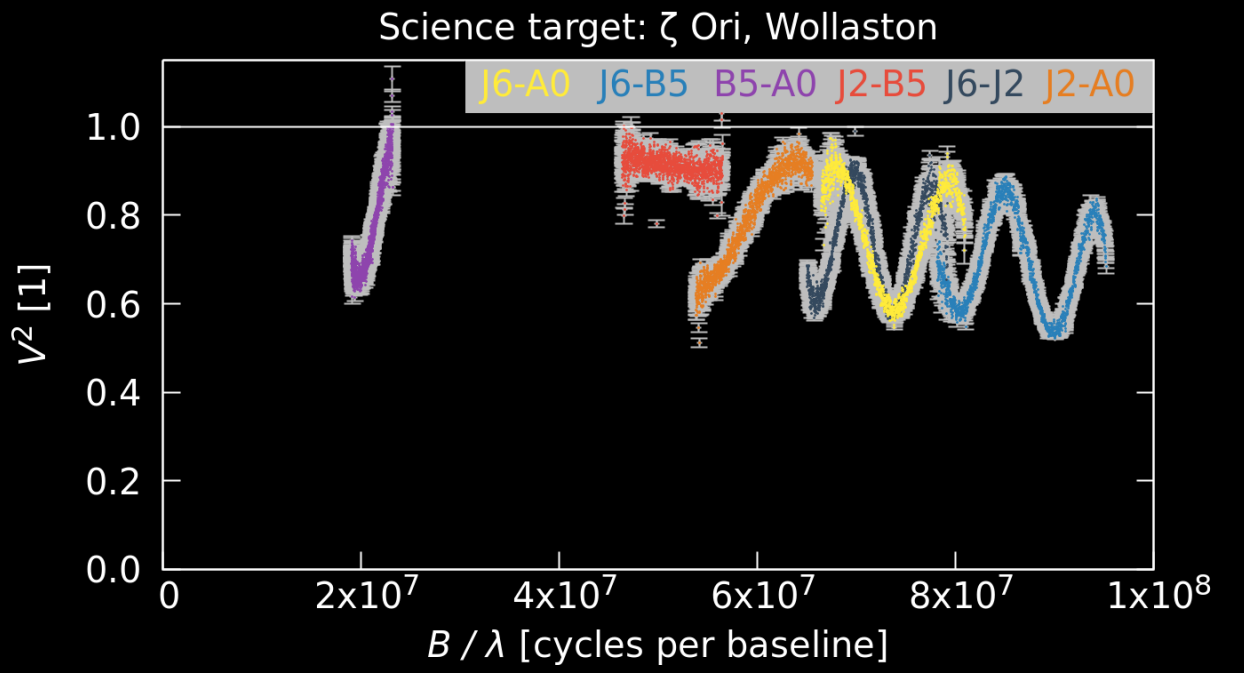


VLTI data

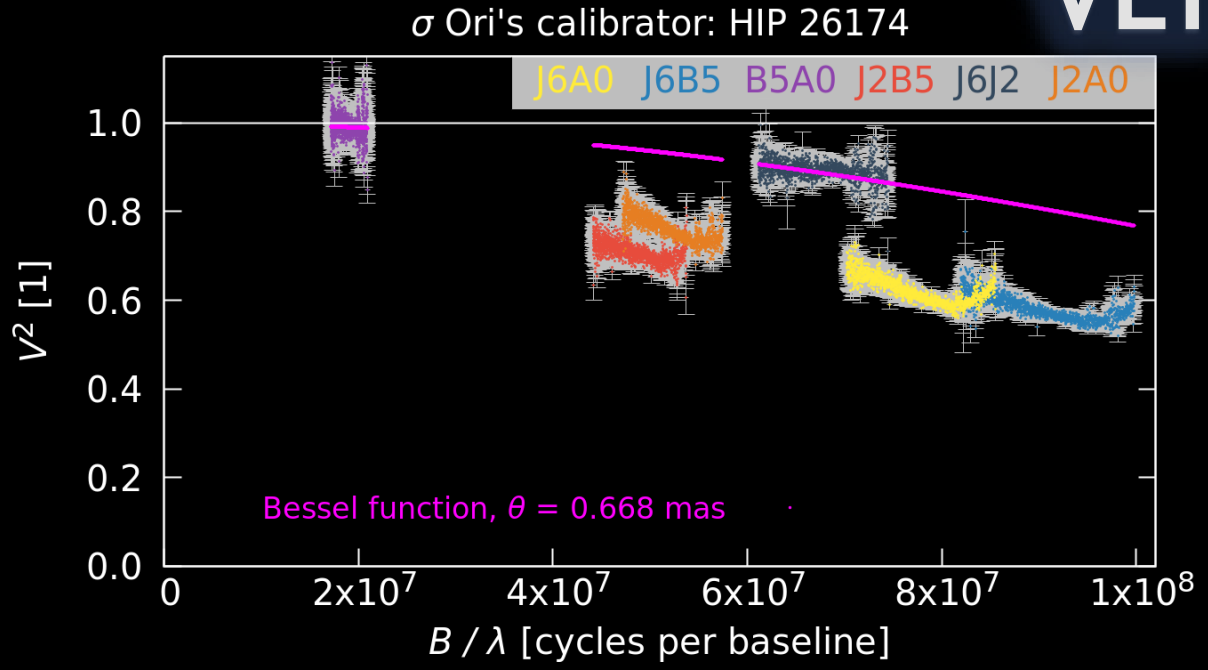

δ Ori's calibrator: HIP 26149
J6A0 J6B5 B5A0 J2B5 J6J2 J2A0
Bessel function, θ = 0.621 mas
V² [1]
B / λ [cycles per baseline]

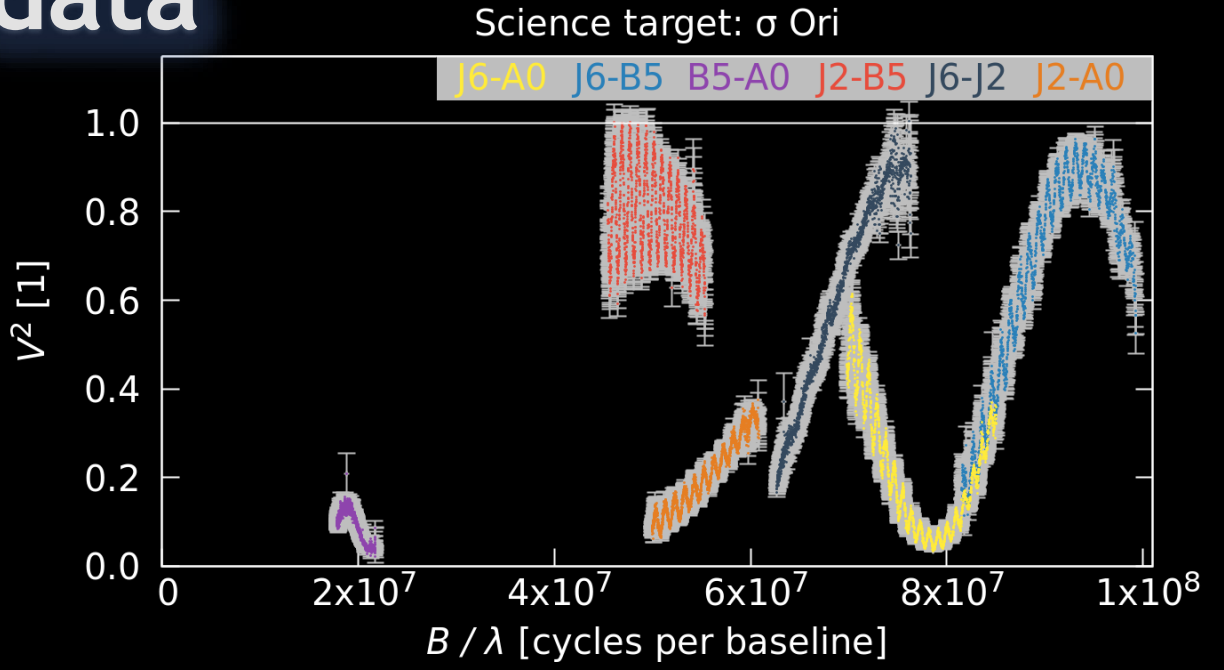

Science target: δ Ori
J6-A0 J6-B5 B5-A0 J2-B5 J6-J2 J2-A0
V² [1]
B / λ [cycles per baseline]

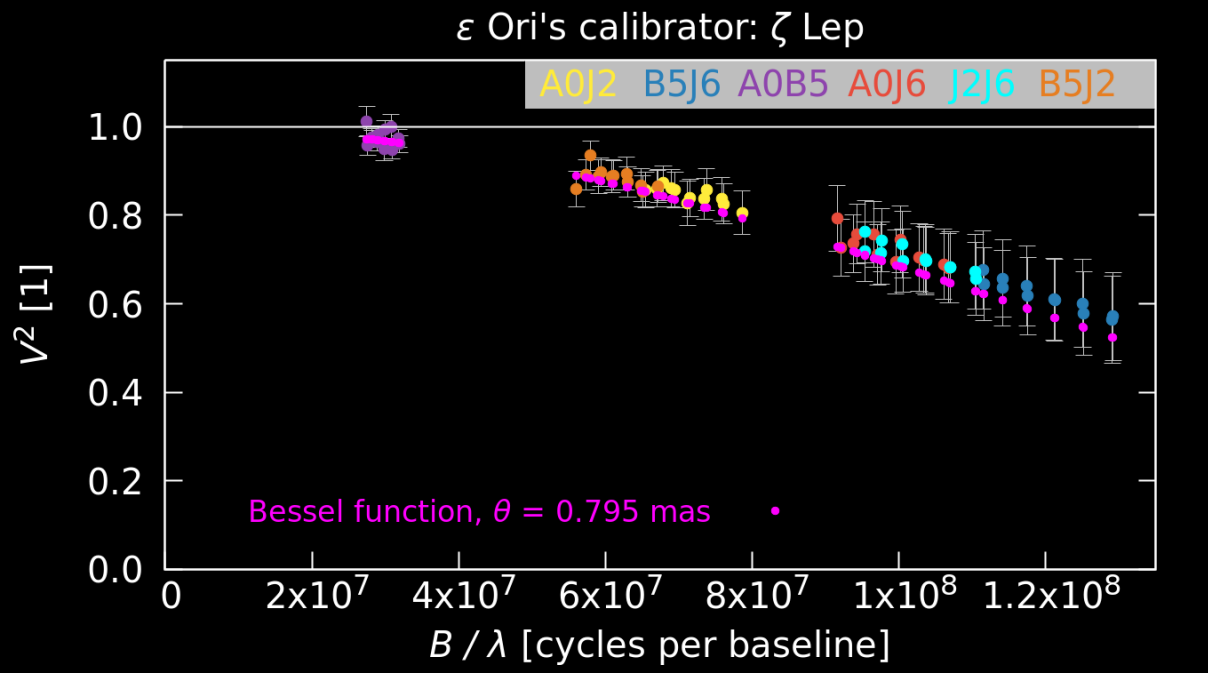

ζ Ori's calibrator: HIP 26108, Wollaston
J6A0 J6B5 B5A0 J2B5 J6J2 J2A0
Bessel function, θ = 1.935 mas
V² [1]
B / λ [cycles per baseline]

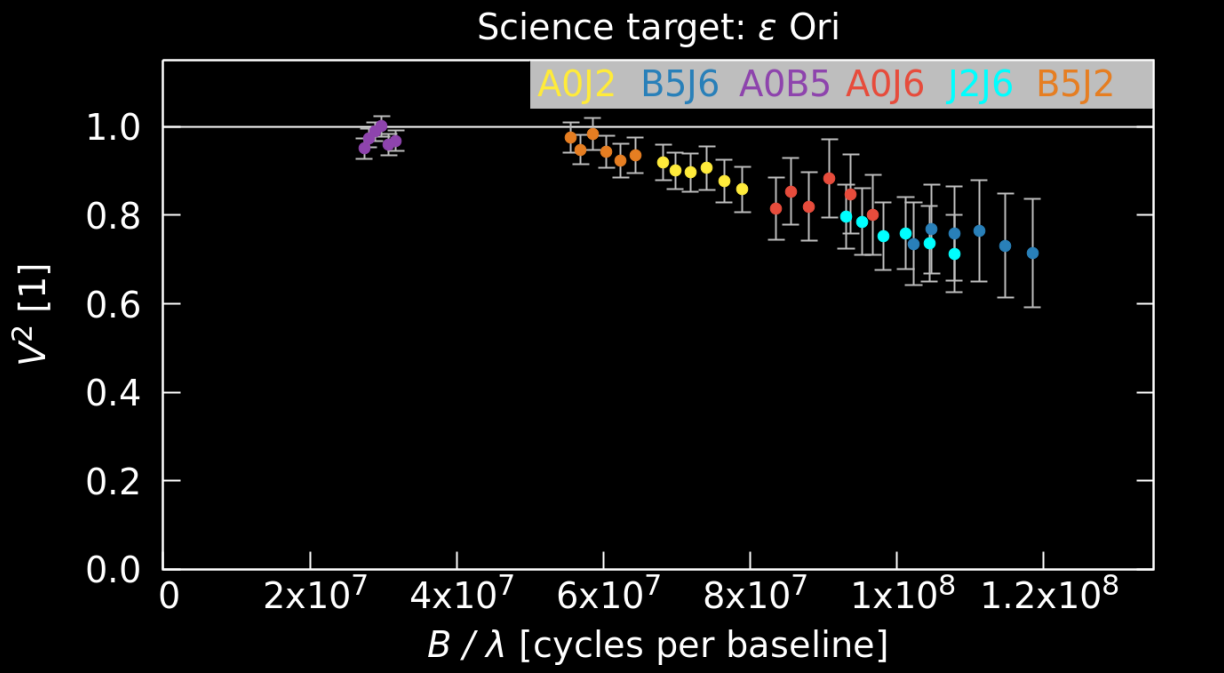

Science target: ζ Ori, Wollaston
J6-A0 J6-B5 B5-A0 J2-B5 J6-J2 J2-A0
V² [1]
B / λ [cycles per baseline]

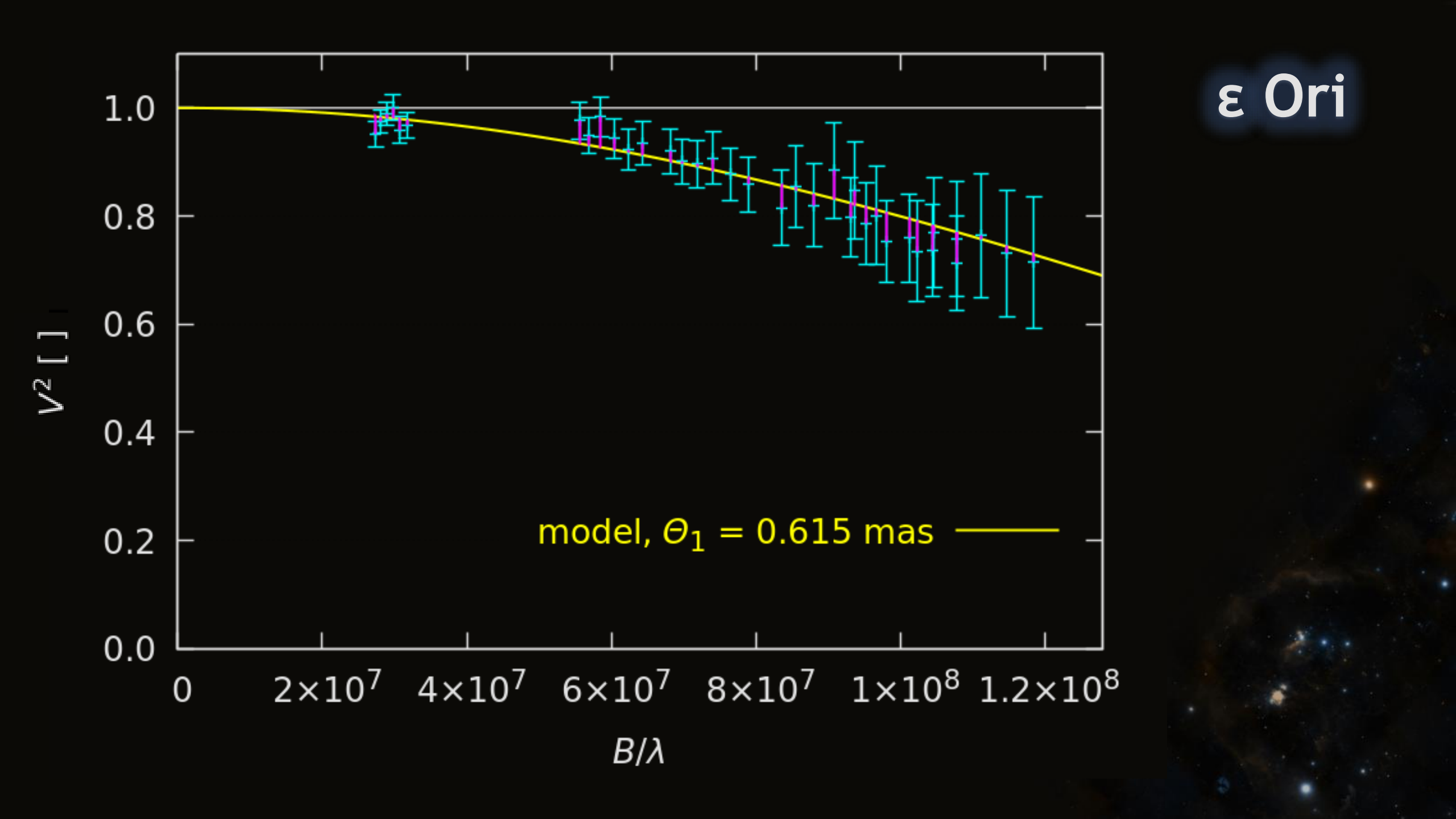
VLTI data

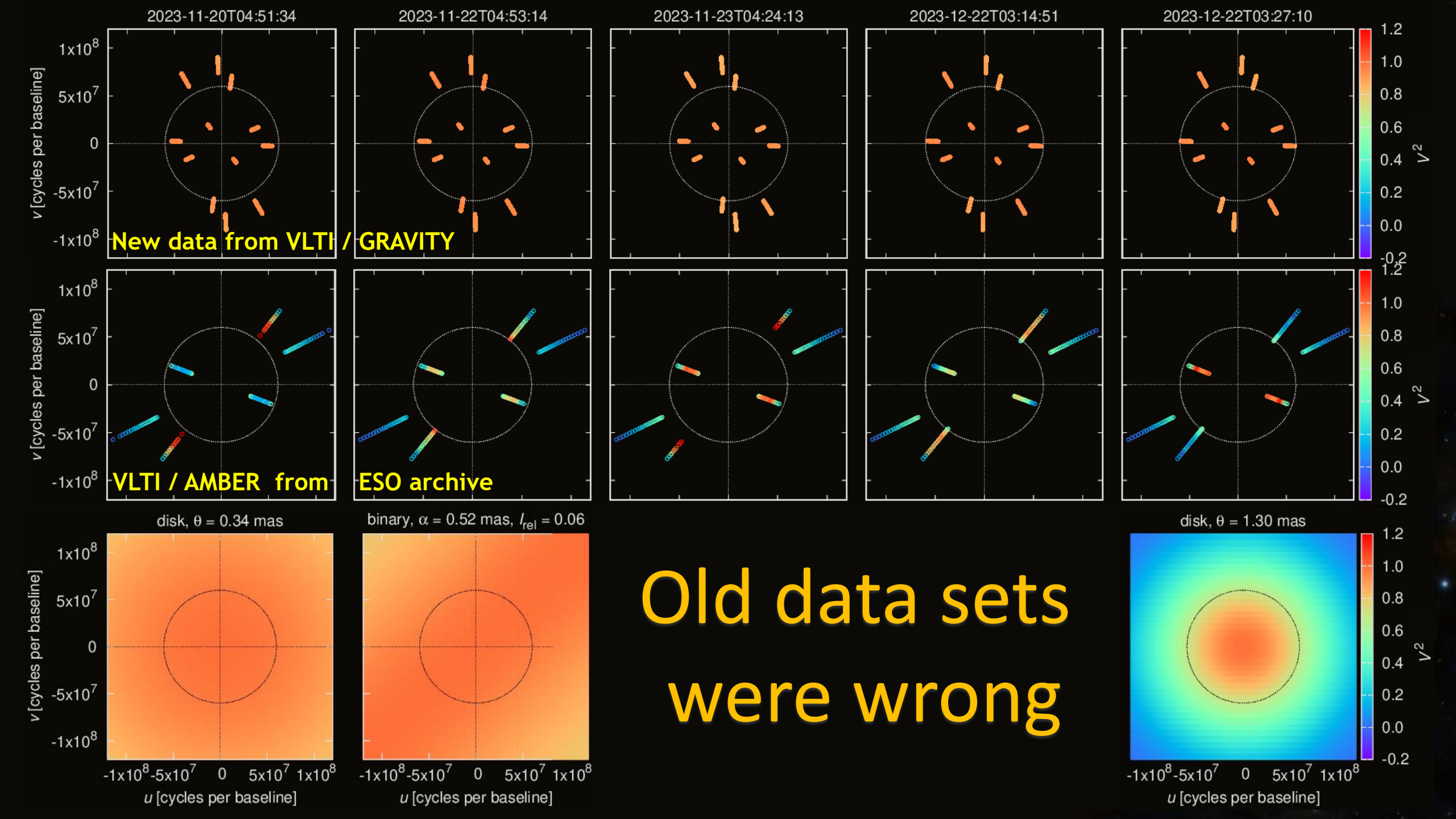

σ Ori's calibrator: HIP 26174
J6A0 J6B5 B5A0 J2B5 J6J2 J2A0
Bessel function, θ = 0.668 mas
V² [1]
B / λ [cycles per baseline]


Science target: σ Ori
J6-A0 J6-B5 B5-A0 J2-B5 J6-J2 J2-A0
V² [1]
B / λ [cycles per baseline]

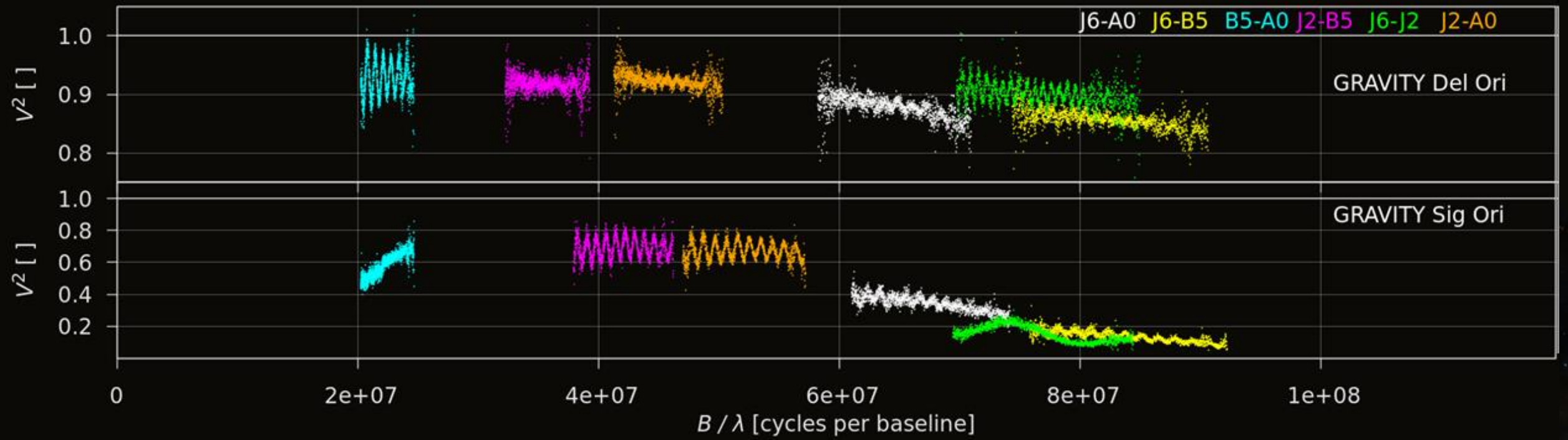

ε Ori's calibrator: ζ Lep
A0J2 B5J6 A0B5 A0J6 J2J6 B5J2
Bessel function, θ = 0.795 mas
V² [1]
B / λ [cycles per baseline]


Science target: ε Ori
A0J2 B5J6 A0B5 A0J6 J2J6 B5J2
V² [1]
B / λ [cycles per baseline]


ε Ori
1.0
0.8
0.6
0.4
0.2
0.0
V^2 [ ]
model, Θ_1 = 0.615 mas
0
2×10^7
4×10^7
6×10^7
8×10^7
1×10^8
1.2×10^8
B/λ


2023-11-20T04:51:34
2023-11-22T04:53:14
2023-11-23T04:24:13
2023-12-22T03:14:51
2023-12-22T03:27:10
v [cycles per baseline]
1x10^8
5x10^7
0
-5x10^7
-1x10^8
New data from VLTI / GRAVITY
VLTI / AMBER from ESO archive
V^2
1.2
1.0
0.8
0.6
0.4
0.2
0.0
-0.2
disk, θ = 0.34 mas
binary, α = 0.52 mas, I_rel = 0.06
disk, θ = 1.30 mas
-1x10^8 -5x10^7 0 5x10^7 1x10^8
u [cycles per baseline]
Old data sets were wrong

Future plans



analysis of other systems in the Orion belt

evolution of systems with MESA code

MESA

Alžběta Opištilová, arXiv:2301.10290

e-mail: betsimsim@seznam.cz

help in your project

help with proposals

inspiring environment

new experiences

unique experience