

# OGLE V

## the Next Phase of the OGLE Survey

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University of Warsaw

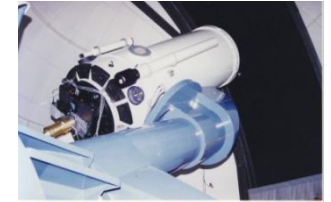


# The Optical Gravitational Lensing Experiment (1992 - ....)



## Phases of the OGLE Survey:

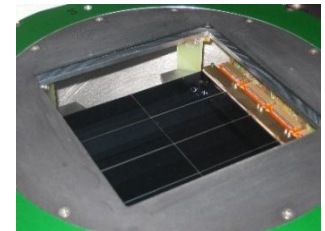
**OGLE-I** (1992 – 1995). 1 m Swope telescope at Las Campanas Observatory, Chile. **~2 million** stars observed. Microlensing



**OGLE-II** (1997 – 2000). 1.3 m Warsaw telescope. **~40 million** stars observed. Variable and non-Variable Stars in GB, MC

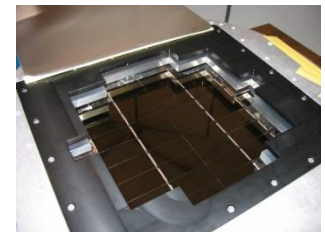


**OGLE-III** (2001– 2009). 8k x 8k mosaic CCD. **~200 million stars** observed (GB, GD, MC). Extrasolar Planets, Microlensing



**OGLE-IV** (2010 – ....). 32-chip 256 Mpixel mosaic CCD. **>Two billion** stars regularly monitored

(**March 17, 2020 – August 12, 2022**: CoViD-19 pandemic stopped observations)



<http://ogle.astrouw.edu.pl>

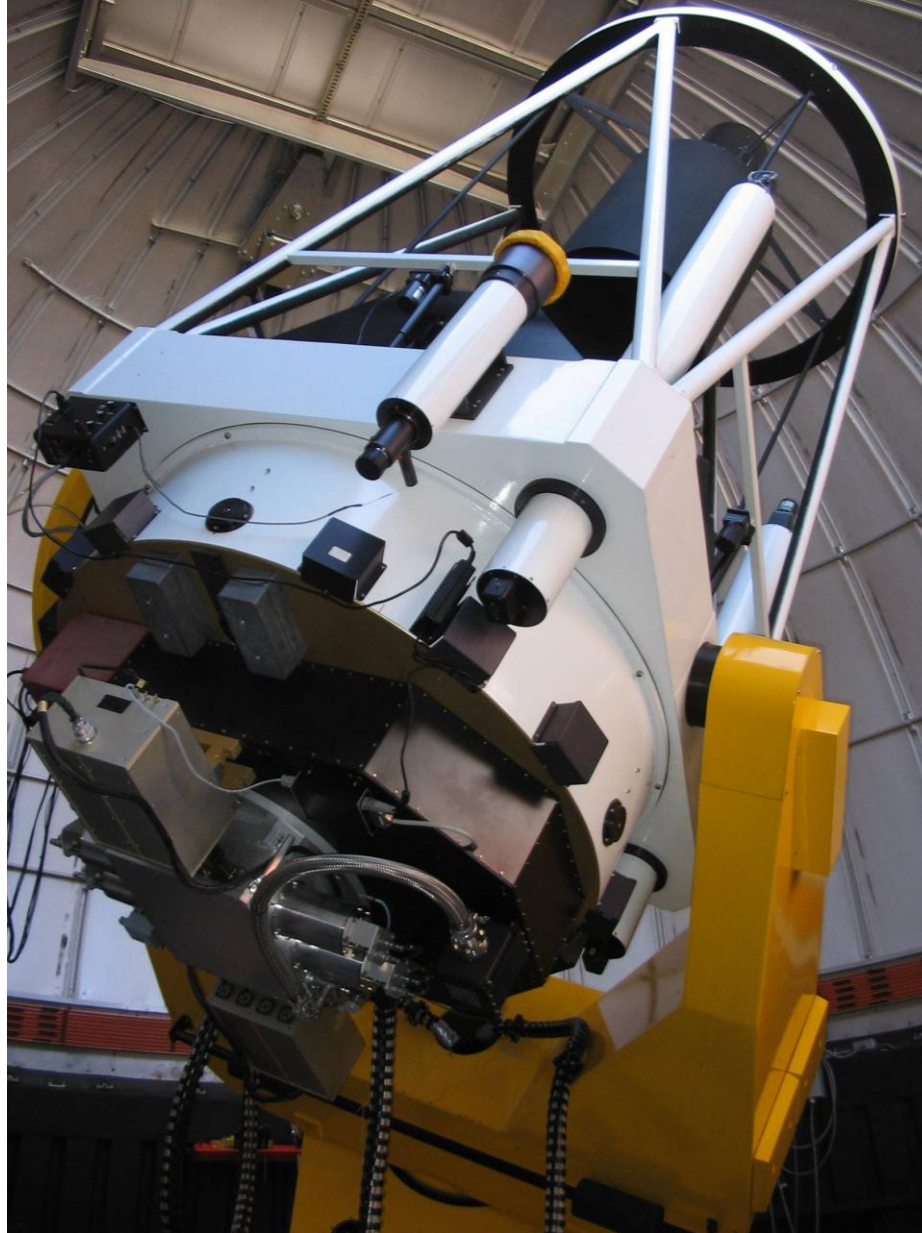


# Las Campanas Observatory Chile



# OGLE

HARDWARE





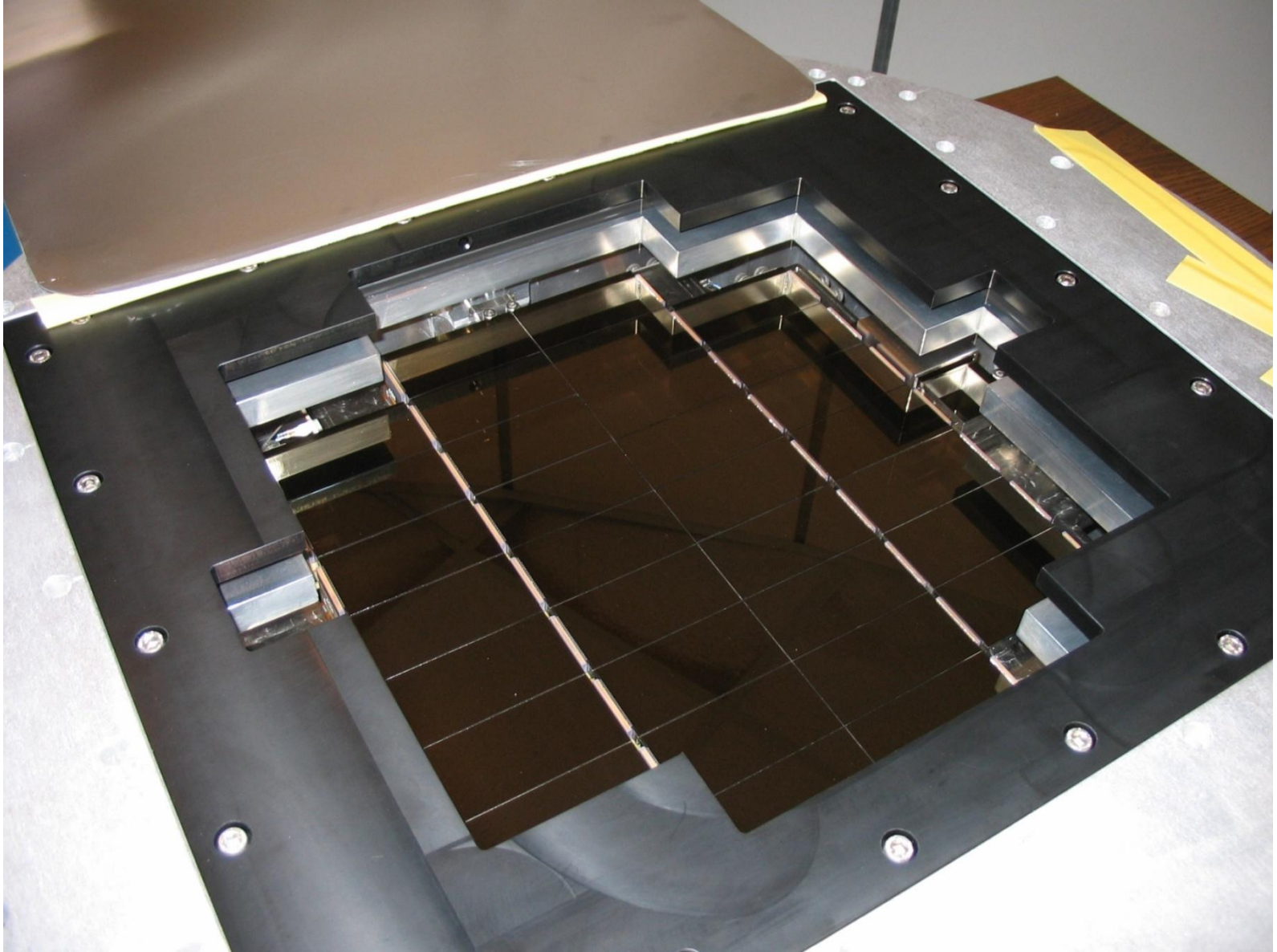
# OGLE

## HARDWARE



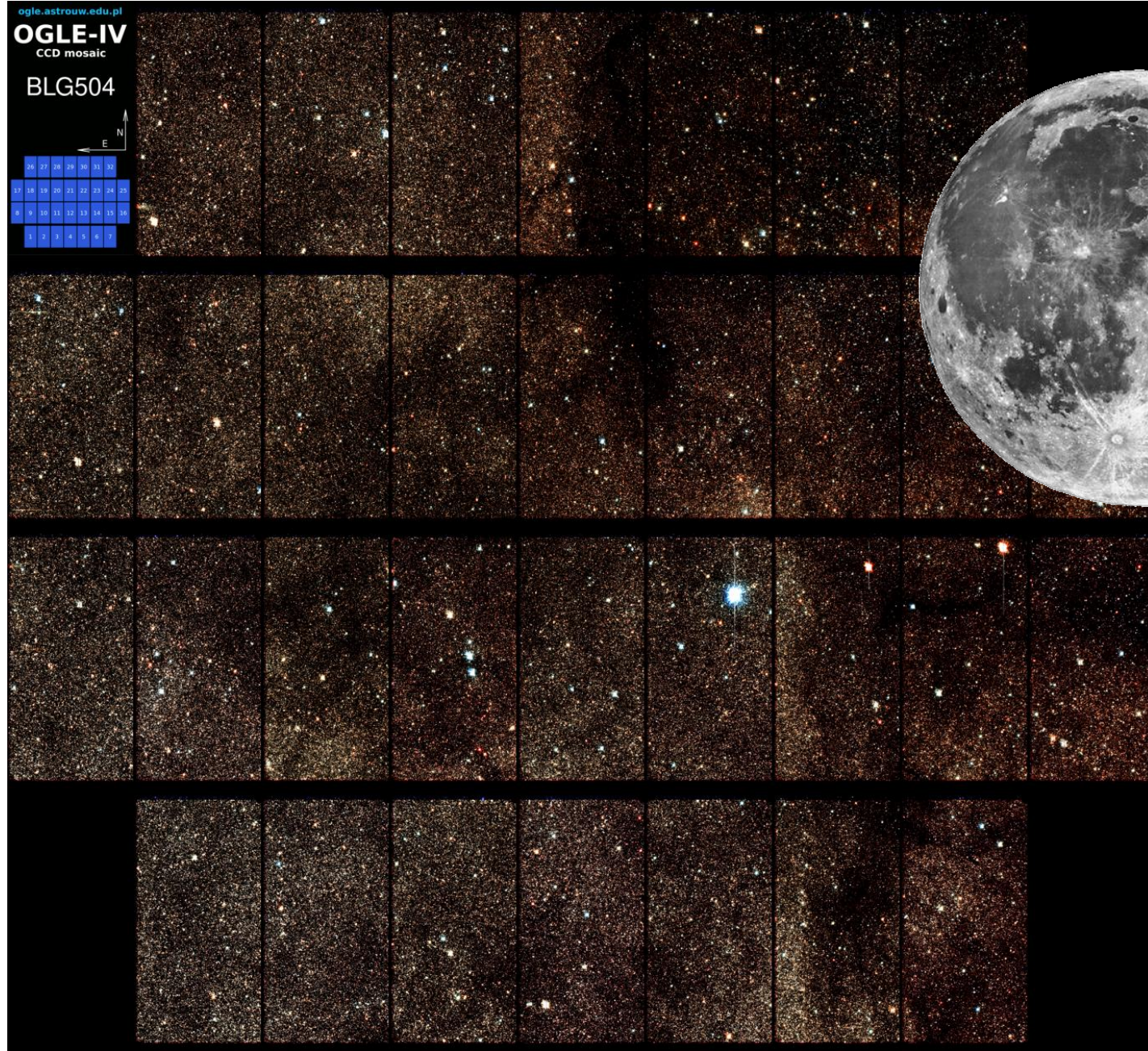
# OGLE

HARDWARE





# OGLE-IV CAMERA: 1.4 deg<sup>2</sup> FOV, I~21mag

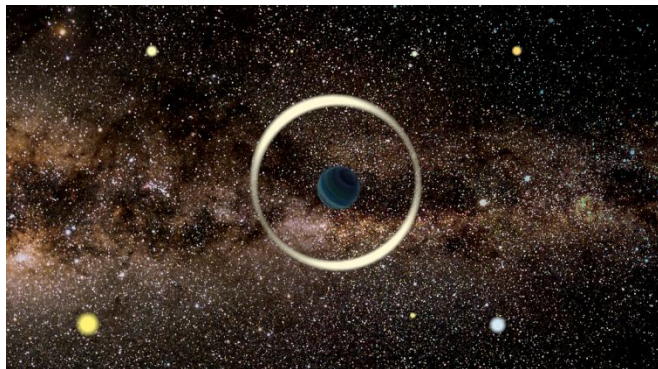


*~6  
million  
stars in  
this  
picture!*

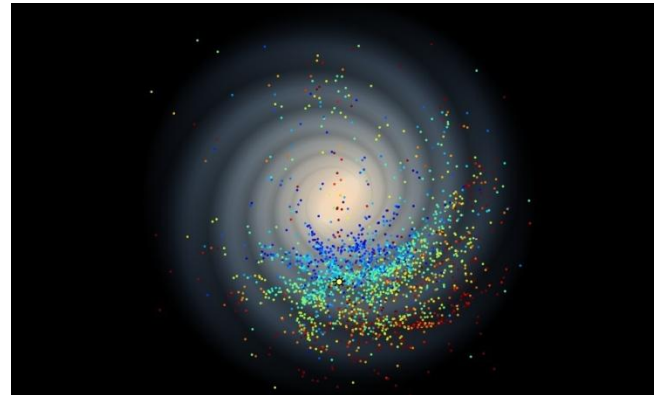
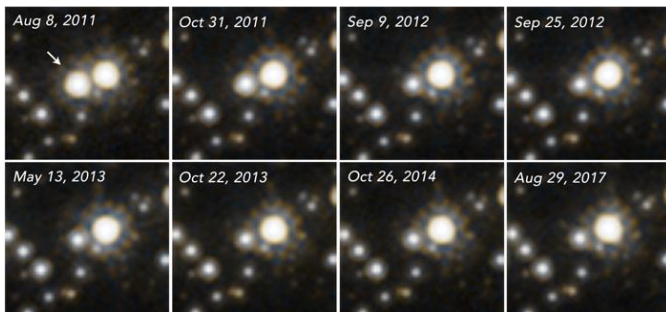




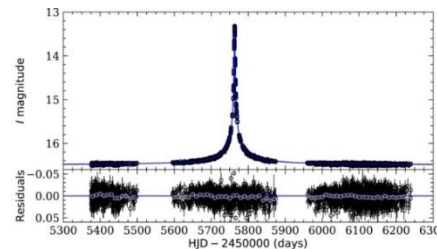
# Science Factory



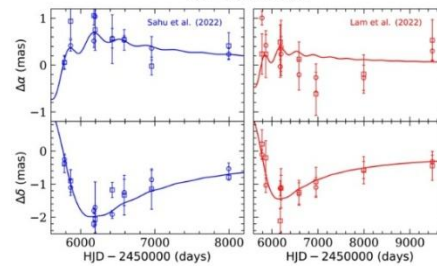
Free Floating Planets  
*Nature* 2017, >180 citations



3-D Milky Way Map  
*Science* 2019, >120 citations



Free Floating Black Hole  
2022



OGLE-IV (February 2023):  
~460 papers  
>16300 citations

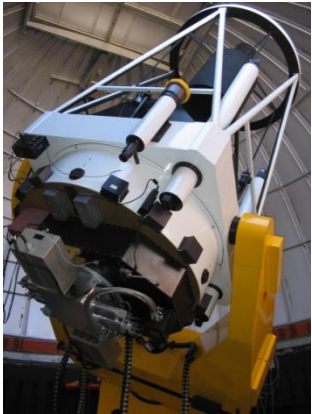


# The main goals of the OGLE V project

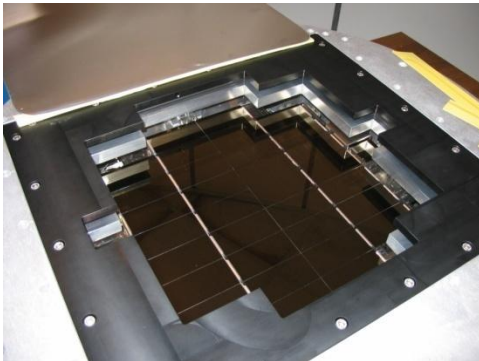
- Resuming regular operation of the Warsaw Telescope at Las Campanas Observatory
- Starting the OGLE-V phase focused on new scientific challenges of the 2020s decade

# OGLE

## HARDWARE UPGRADES:



A new telescope control system (TCS) for modern telescope operation  
From DFM Engineering – the telescope manufacturer  
(last upgrade in 2007!)



CCD Mosaic camera upgrade:  
New optical filters (*g* and *z* bands of the Sloan system)  
Upgrades and engineering of the electronics

# OGLE V

## Budget:

• New TCS:	170 000 pln
• New filters:	300 000 pln
• Camera electronics:	125 000 pln
• Installation and restarting of OGLE-V:	120 000 pln
• Total	715 000 pln
• Contribution of the Astronomical Observatory (SPUB)	215 000 pln

## Risks and mitigation plan:

This is a high-gain/moderate risk project. Main risks are:

1. CoViD-19 pandemic and travel restrictions remain in 2021-2022.
2. The telescope and camera require severe engineering after >1 year off

Ad. 1. Vaccinations (Chile – the world leader). Reasonable chance to the return to normalcy in the end of 2021. Remote observing

Ad. 2. Longer recovery time than expected. Under control



# Rescue Mission July/August 2022



# Rescue Mission July/August 2022

STYCZEŃ 2020 JANUARY / JANUAR

Poniedziałek	Wtorek	Środa	Czwartek	Piątek	Sobota	Niedziela
1	30	31	1	2	3	4
2	6	7	8	9	10	11
3	13	14	15	16	17	18
4	20	21	22	23	24	25
5	27	28	29	30	31	1

**ZAJĘCIA DYDAKTYCZNE**  
semestr zimowy: 1.10.2019 r. – 16.02.2020 r.  
semestr letni: 17.02.2020 r. – 30.09.2020 r.

**DNI WOLNE OD ZAJĘĆ**  
23.12.2019 r. – 6.01.2020 r.  
10.02.2020 r. – 16.02.2020 r.  
9.04.2020 r. – 14.04.2020 r.  
8-9.05.2020 r. – Jazwemalia  
6.07.2020 r. – 30.09.2020 r.

LUTY 2020 FEBRUARY / FEBRUAR

Poniedziałek	Wtorek	Środa	Czwartek	Piątek	Sobota	Niedziela
5	27	28	29	30	31	1
6	3	4	5	6	7	8
7	10	11	12	13	14	15
8	17	18	19	20	21	22
9	24	25	26	27	28	29

**SEKJE EGZAMINACYJNE**  
28.02.2020 r. – 03.03.2020 r.  
28.01.2020 r. – języki obce  
15.06.2020 r. – 5.07.2020 r.  
15.06.2020 r. – języki obce

**SEKJE EGZAMINACYJNE POPRAWKOWE**  
28.02.2020 r. – 03.03.2020 r.  
29.02.2020 r. – języki obce  
31.08.2020 r. – 13.09.2020 r.  
31.08.2020 r. – języki obce

MARZEC 2020 MARCH / MÄRZ

Poniedziałek	Wtorek	Środa	Czwartek	Piątek	Sobota	Niedziela
9	24	25	26	27	28	29
10	2	3	4	5	6	7
11	9	10	11	12	13	14
12	16	17	18	19	20	21
13	23/30	24/31	25	26	27	28

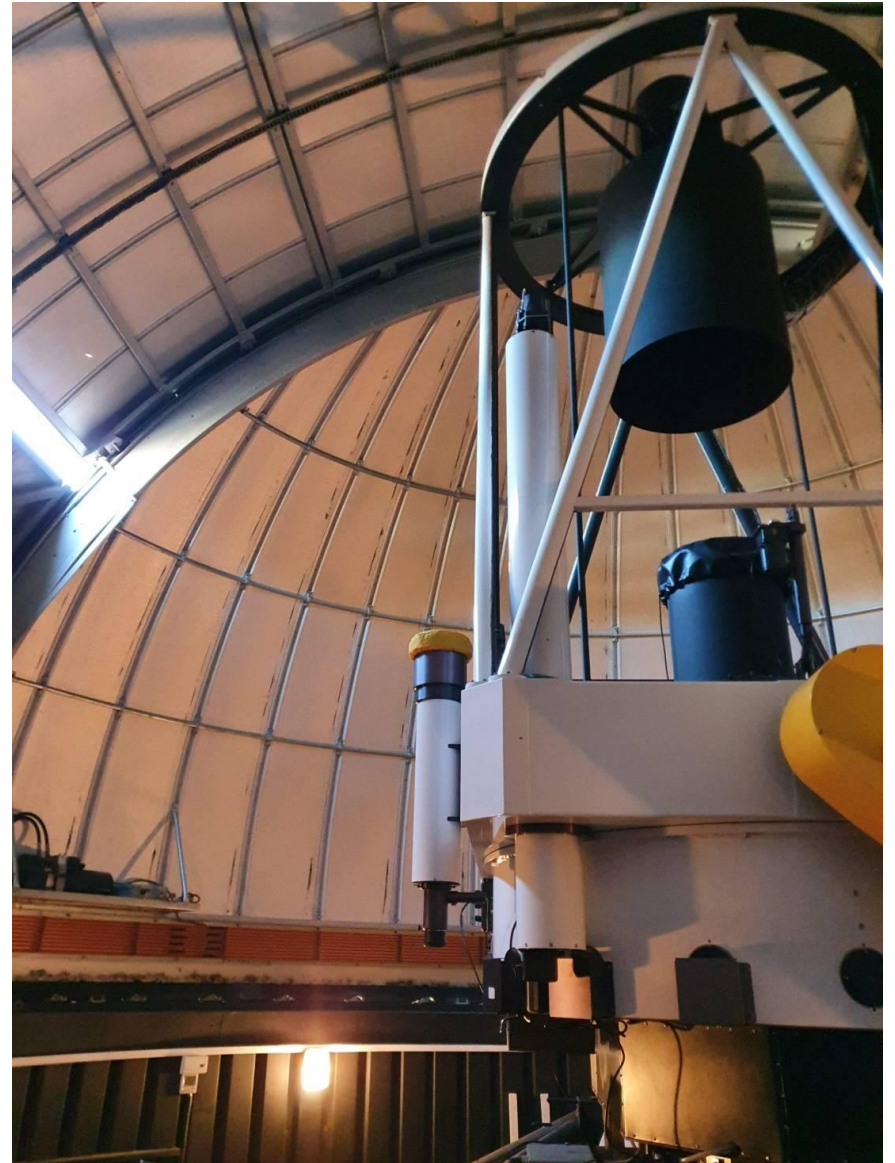
UNIWERSYTET WARSZAWSKI  
ul. Krakowskie Przedmieście 26-28  
00-027 Warszawa

WWW.WIEDU.PL





# Rescue Mission July/August 2022



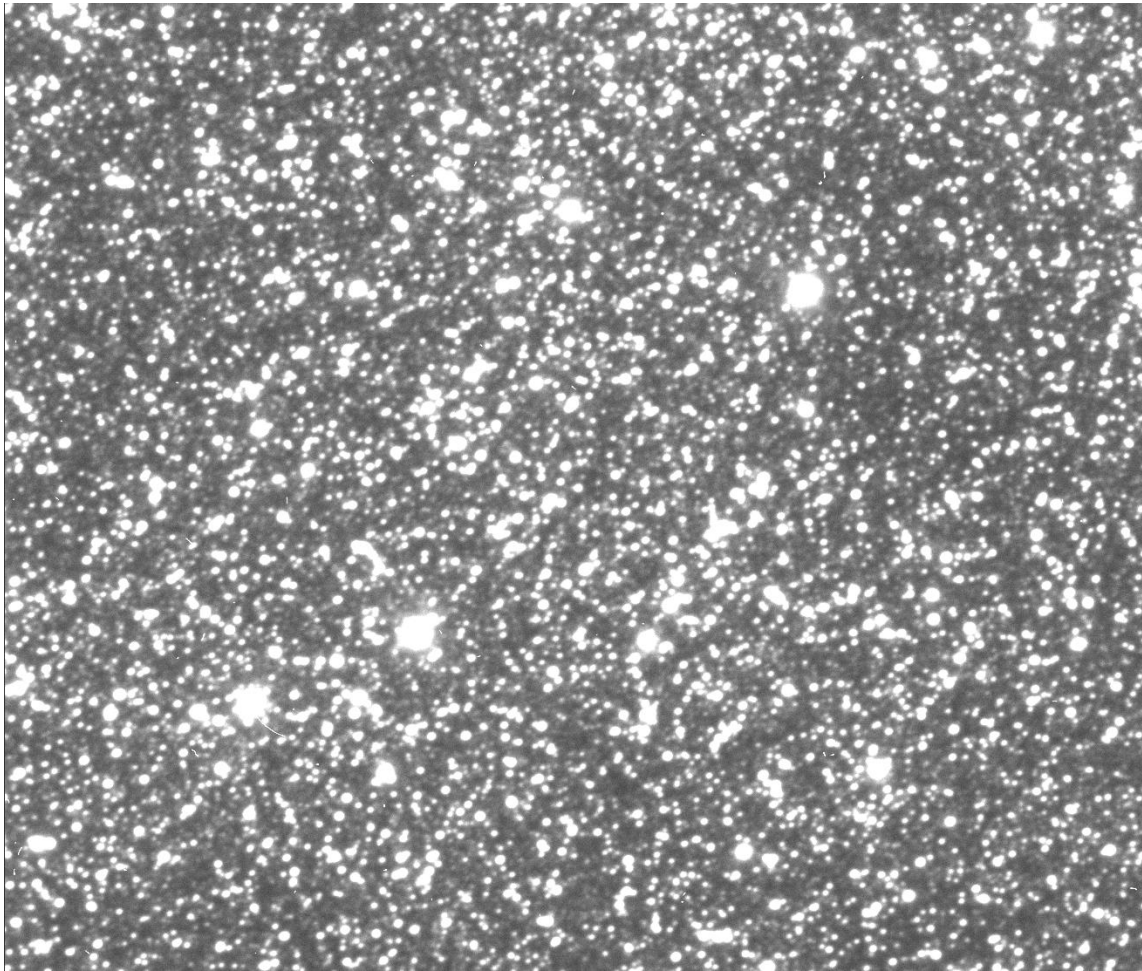
# Rescue Mission July/August 2022



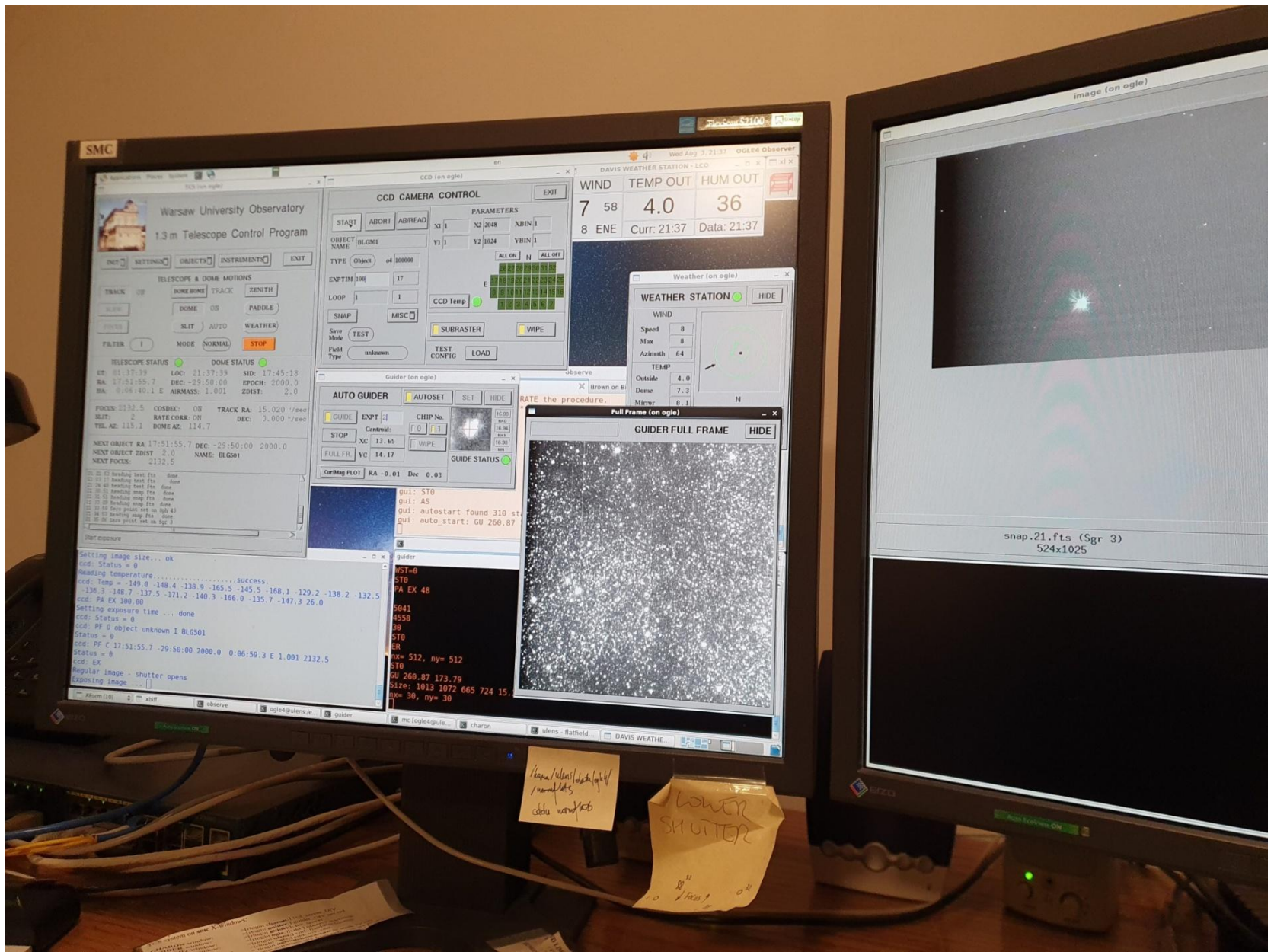


# Rescue Mission July/August 2022

- First technical images: Aug. 4, 2022
- First official images and restarting the OGLE Survey: Aug. 12, 2022

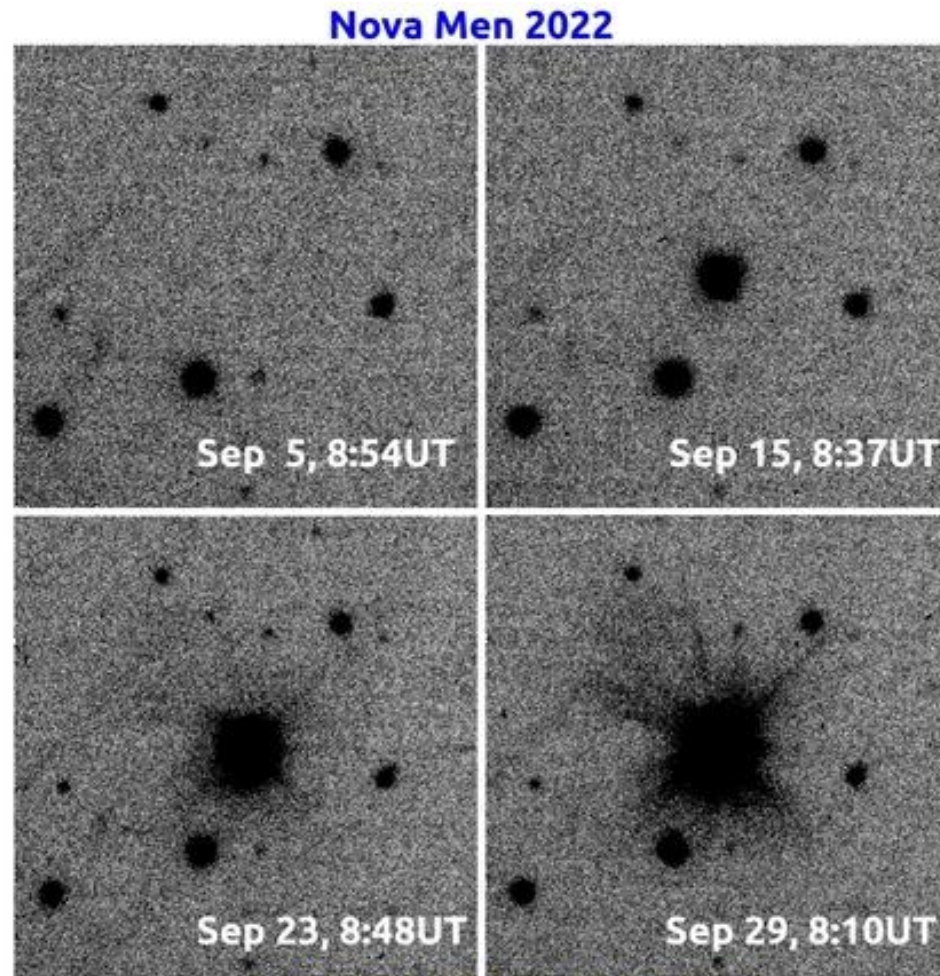


# Rescue Mission July/August 2022



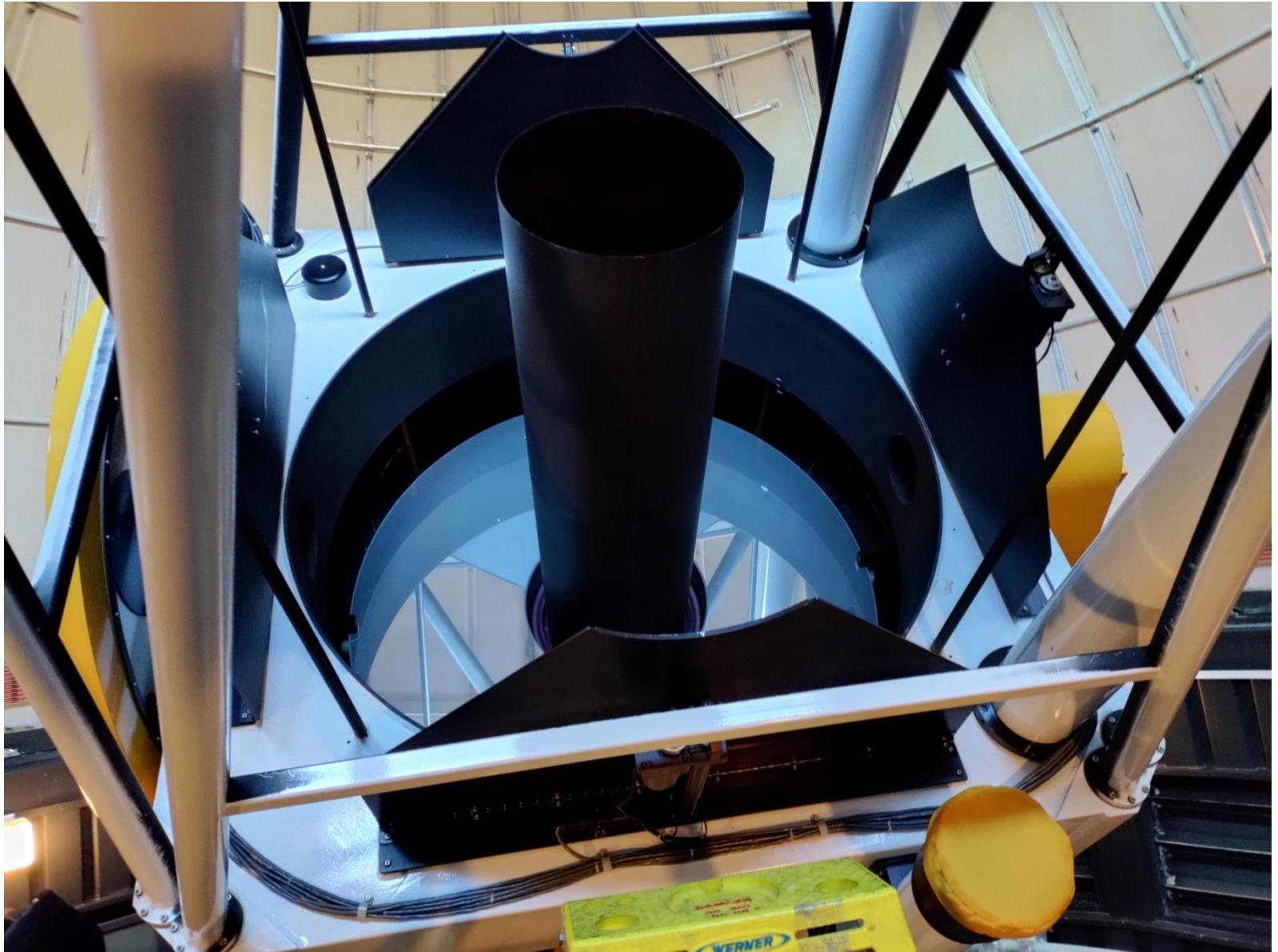
# First Published Scientific Result

## Prediscovery images of Nova Mensae 2022 (ATel 15639)





# Second Engeneering – May 2023



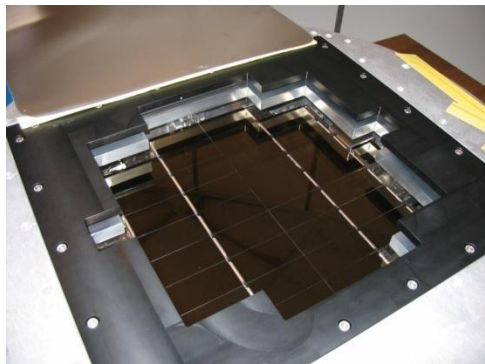
# OGLE V project current status

# OGLE

## HARDWARE UPGRADES:



A new telescope control system (TCS) for modern telescope operation. From DFM Engineering – the telescope manufacturer. Abandoned due to high price increase (40 k\$ → 72 k\$; USD ~3.8 PLN → USD ~5 PLN in 2022). No new installations by DFM out of US due to CoViD. Some spare parts for current TCS ordered



CCD Mosaic camera upgrade:  
New optical filters (*B* and *wide-R* bands)  
Ordered. Delivery – September 2023

Upgrades and engineering of the electronics  
Several new electronic boards ordered. On the way to Las Campanas. Upgrades will be installed during May 2023 engineering run



# Milky Way over the OGLE Telescope

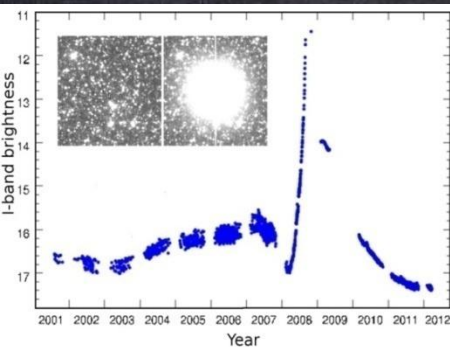


# OGLE – an Extremely Large Sky Variability Survey

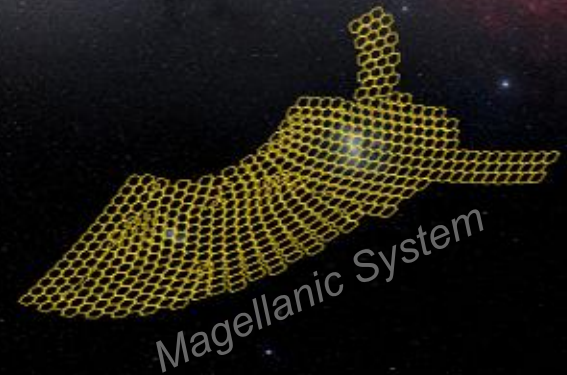


Warsaw 1.3-m @ Las Campanas

- in operation since 1992
- since 2010 as OGLE-IV (Udalski *et al.* 2015)
- >4000 deg<sup>2</sup> sky coverage
- >2.3 billion sources monitored
- 10<sup>12</sup> photometric measurements by 2016
- >22,000 microlensing detections
- >80 extrasolar planets
- >1,000,000 new variable periodic stars



Milky Way



Magellanic System