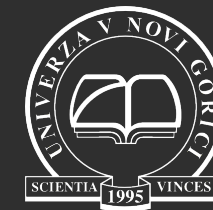


arnes 
povezujemo znanje



MREŽA ZNANJA

Ljubljana, 3.–5. december 2024

Observatorij Vere Rubin in LSST – največji astronomski pregled neba doslej

Andreja Gomboc

Center za astrofiziko in kozmologijo

Univerza v Novi Gorici



400 let teleskopov

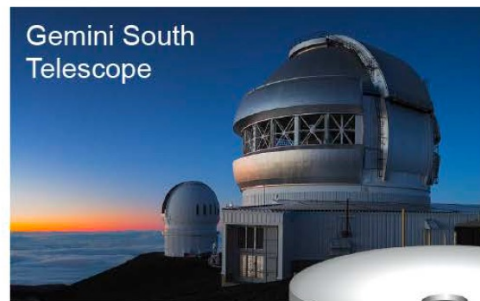
- 1609: prva vizualna opazovanja

- danes: 10-m zrcala, CCD kamere

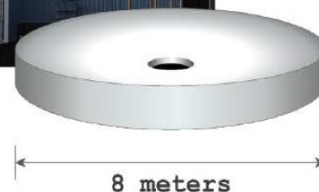
- sateliti

zorno polje ali **globina** pogleda v vesolje?

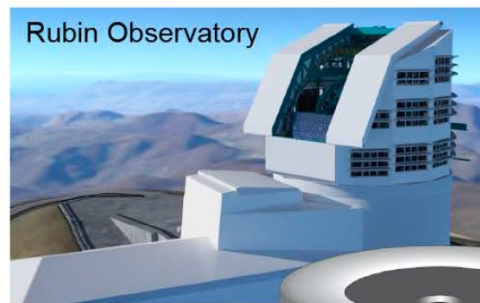
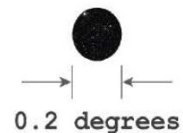
Observatorij Vere Rubin:
oboje!



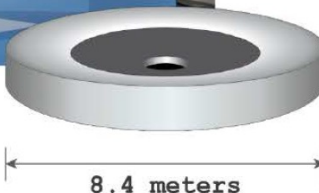
Gemini South Telescope



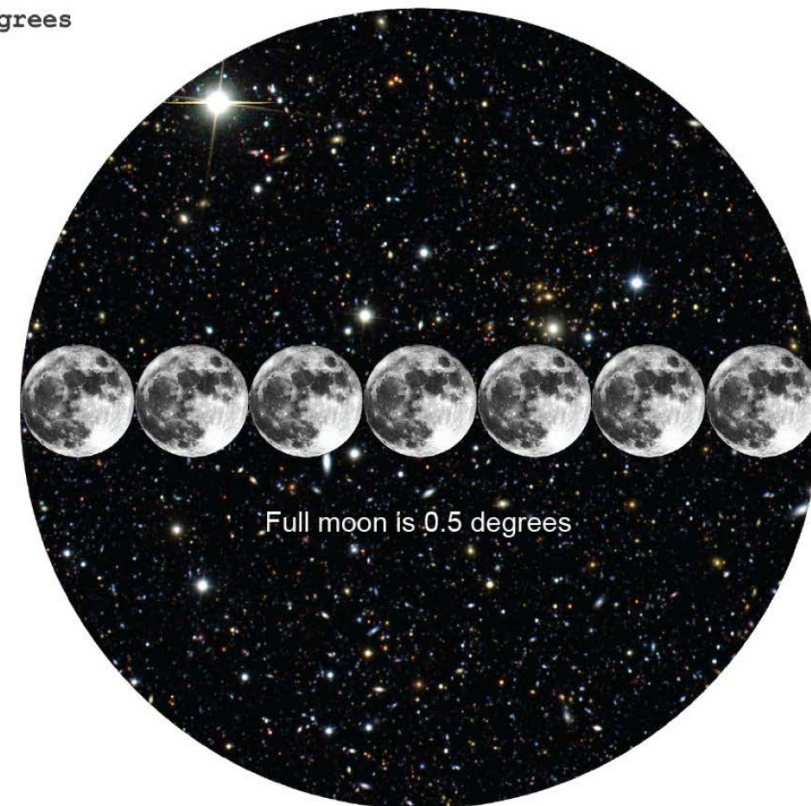
8 meters



Rubin Observatory



8.4 meters



3.5 degrees

LSST @ Observatorij Vere Rubin

Cerro Pachon, Čile,
8,4-m teleskop
zorno polje 9,6 kv. stopinj
6 barvnih filtrov: u, g, r, i, z, y
mejni sij $r \sim 24.5$ v enem posnetku
10-letni pregled neba **Legacy Survey of Space and Time – LSST**
 $r \sim 27.5$ sestavljen posnetek

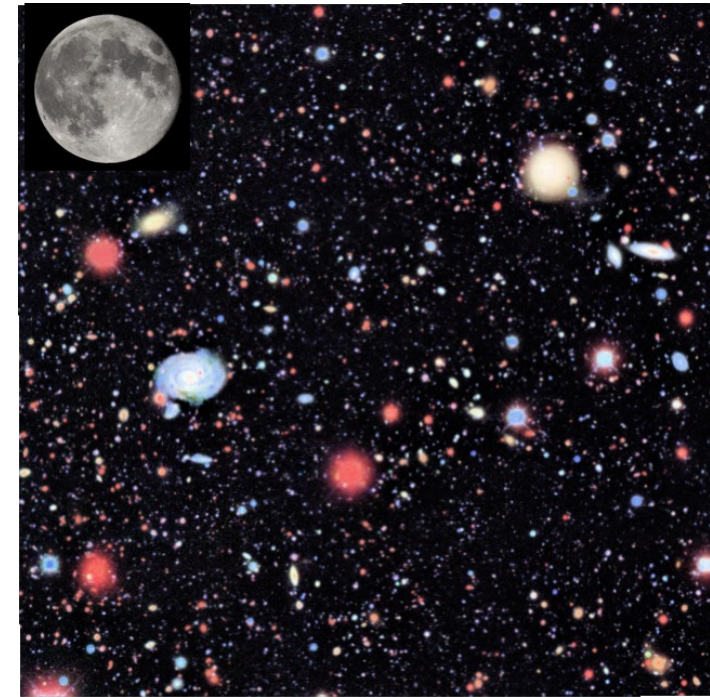
Vera Cooper Rubin
(1928 - 2016)



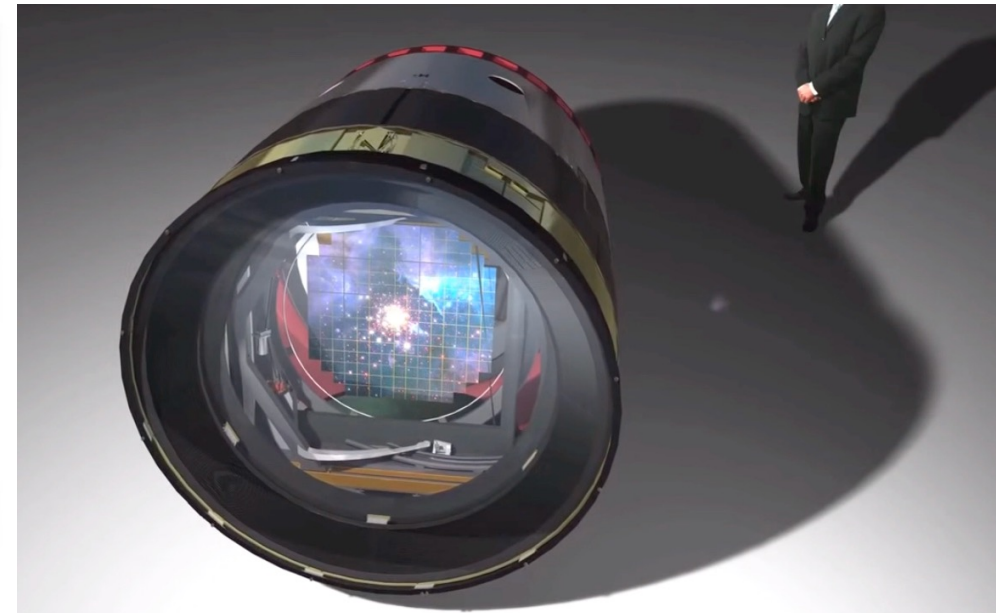
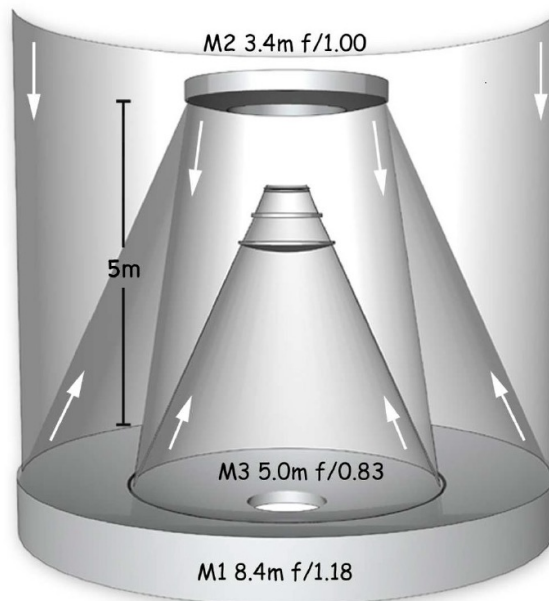
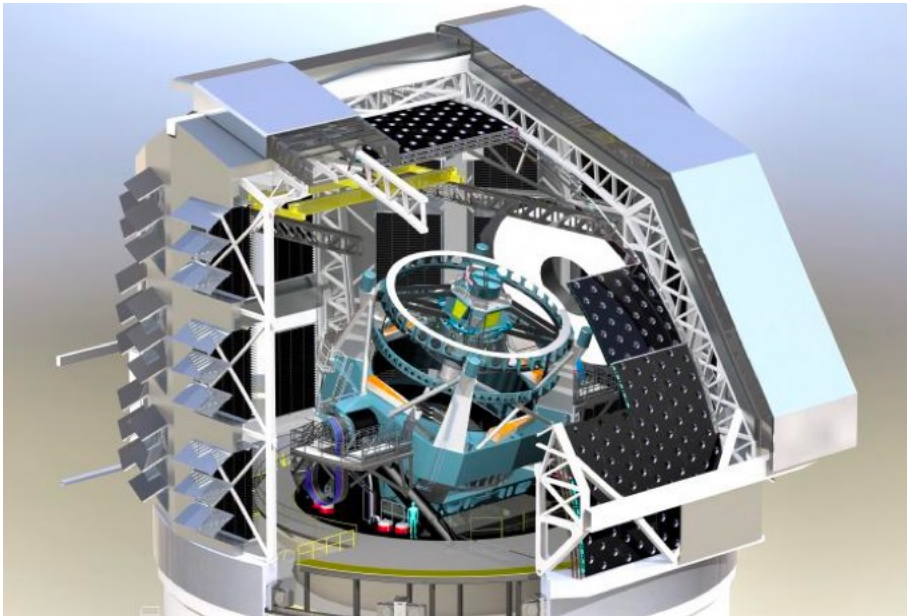
zorno polje + največja kamera

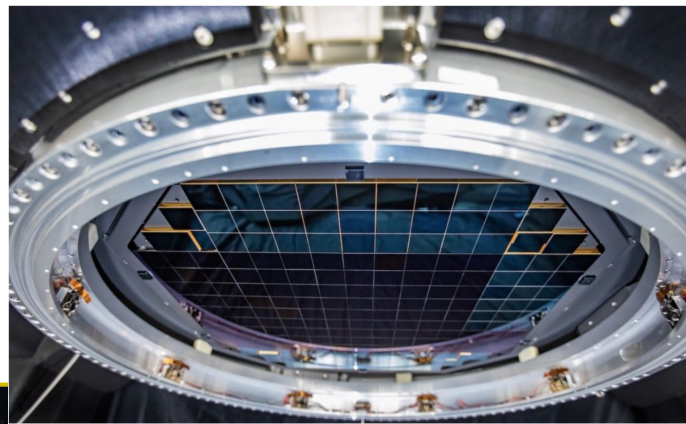
zorno polje 9.6 deg^2 pokrije celo vidno nebo v 3 nočeh
3.2 Gigapixels kamera

1000 posnetkov/noč
10 let, 800 obiskov/polje



Simonyi Survey Telescope





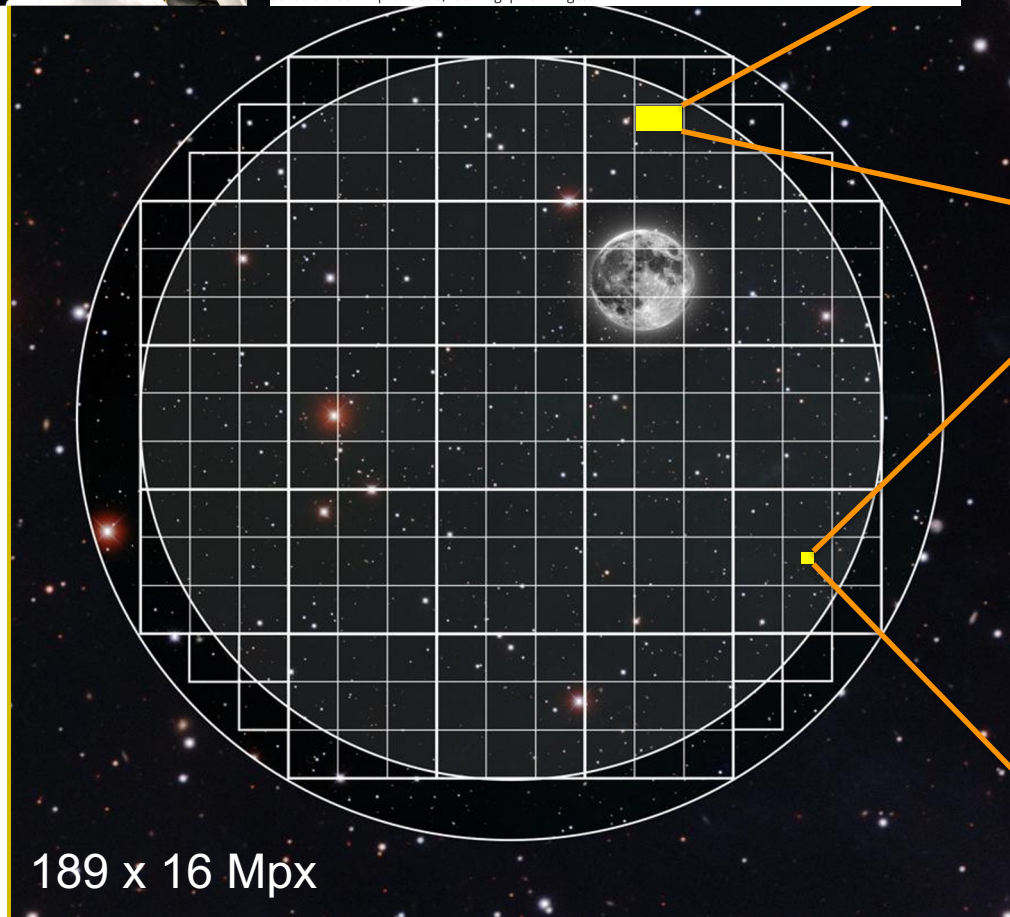
The complete focal plane of the future LSST Camera is more than 2 feet wide and contains 189 individual sensors that will produce 3,200-megapixel images.



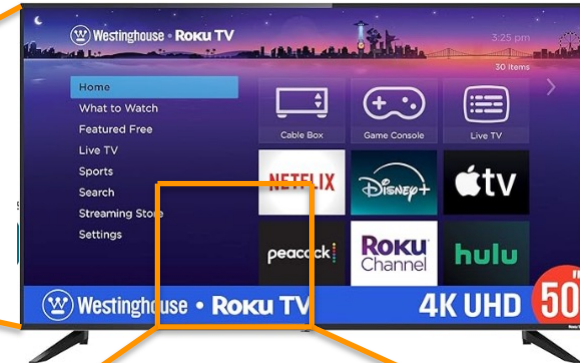
17 milijard zvezd
20 milijard galaksij
x 800 opazovanj

okoli 30-40 TB /noč

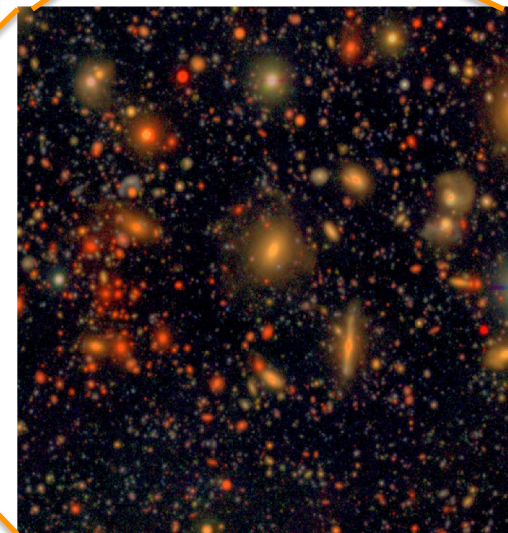
skupno 500 PB
podatkovnih
produktov



189 x 16 Mpx



HDTV: 8 Mpix
CCD: 16 Mpix



HSC gri, $r \sim 27$
3.5' x 3.5', 15 in 1 CCD

about 1/10 of the
full Moon's diam.

similar to HST's ACS

LSST will deliver
about 5 million such
images in 10 years

HST took 100,000
ACS images in 20 yrs

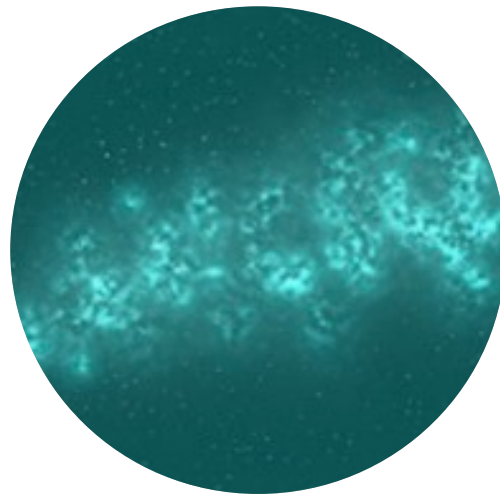
HST: Hubble Space Telescope
HSC: camera on Subaru telescope



1 set podatkov LSST– 4 glavne raziskovalne teme



Osončje



Galaksija



**temna snov
in
temna energija**



**tranzienti
in
spremenljive zvezde**

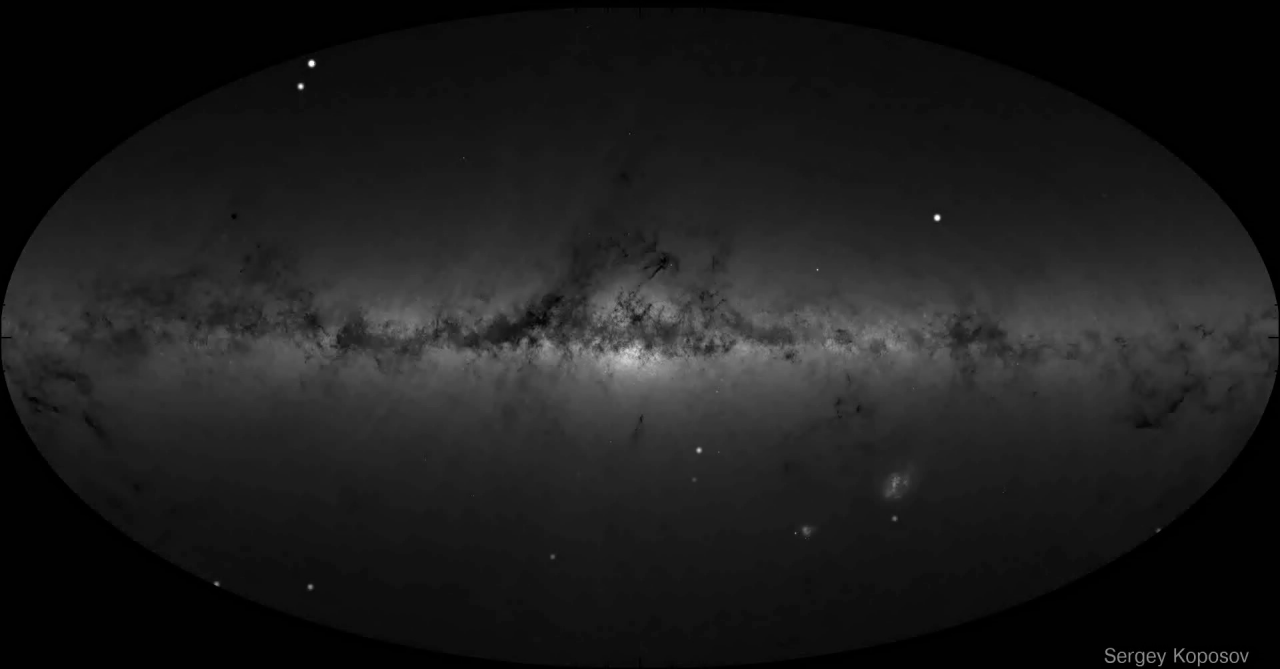


tranzienti

izbruhi sevanja gama

eksplozije supernov

Year 1985.000

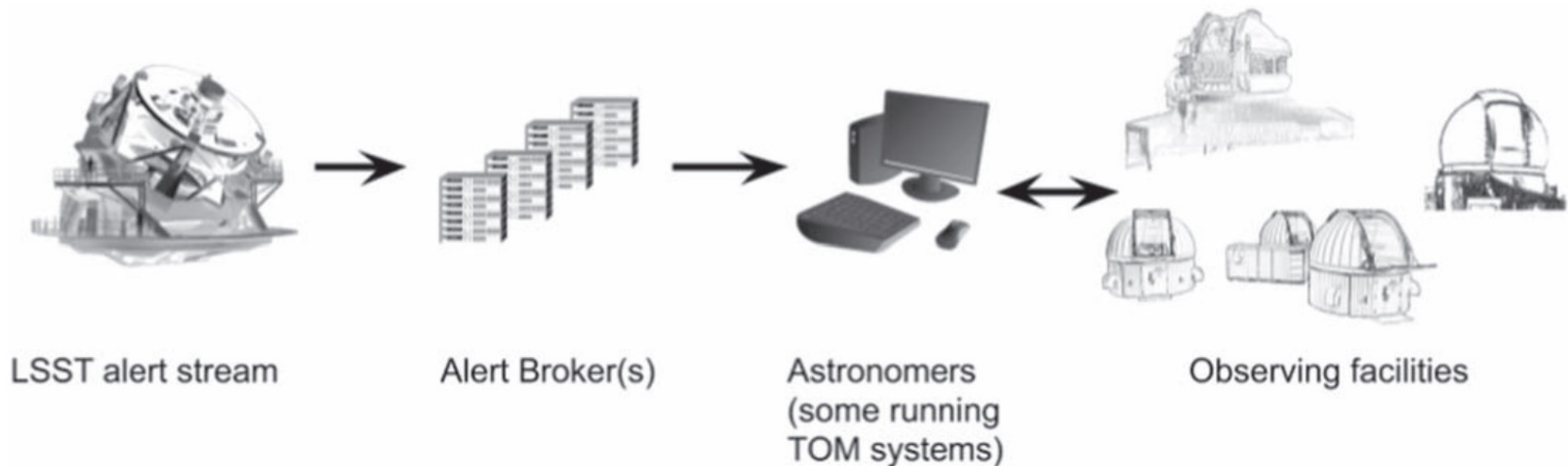
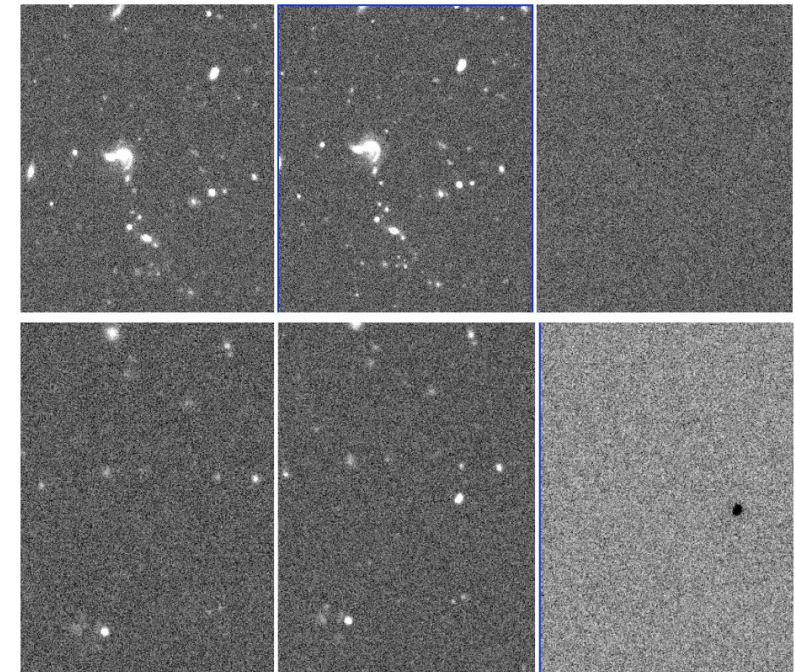


LSST Alerts

posnetek – primerjava s „template“ posnetkom

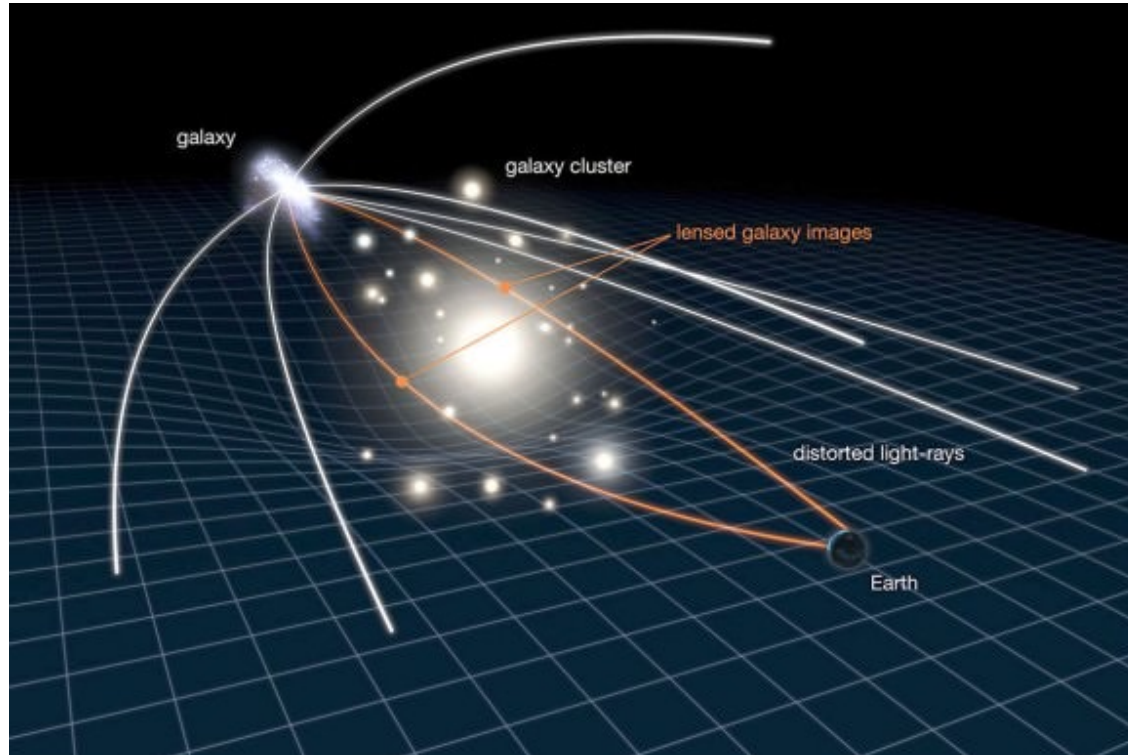
~ 10^6 na noč

distribucija obvestil o „alertih“:



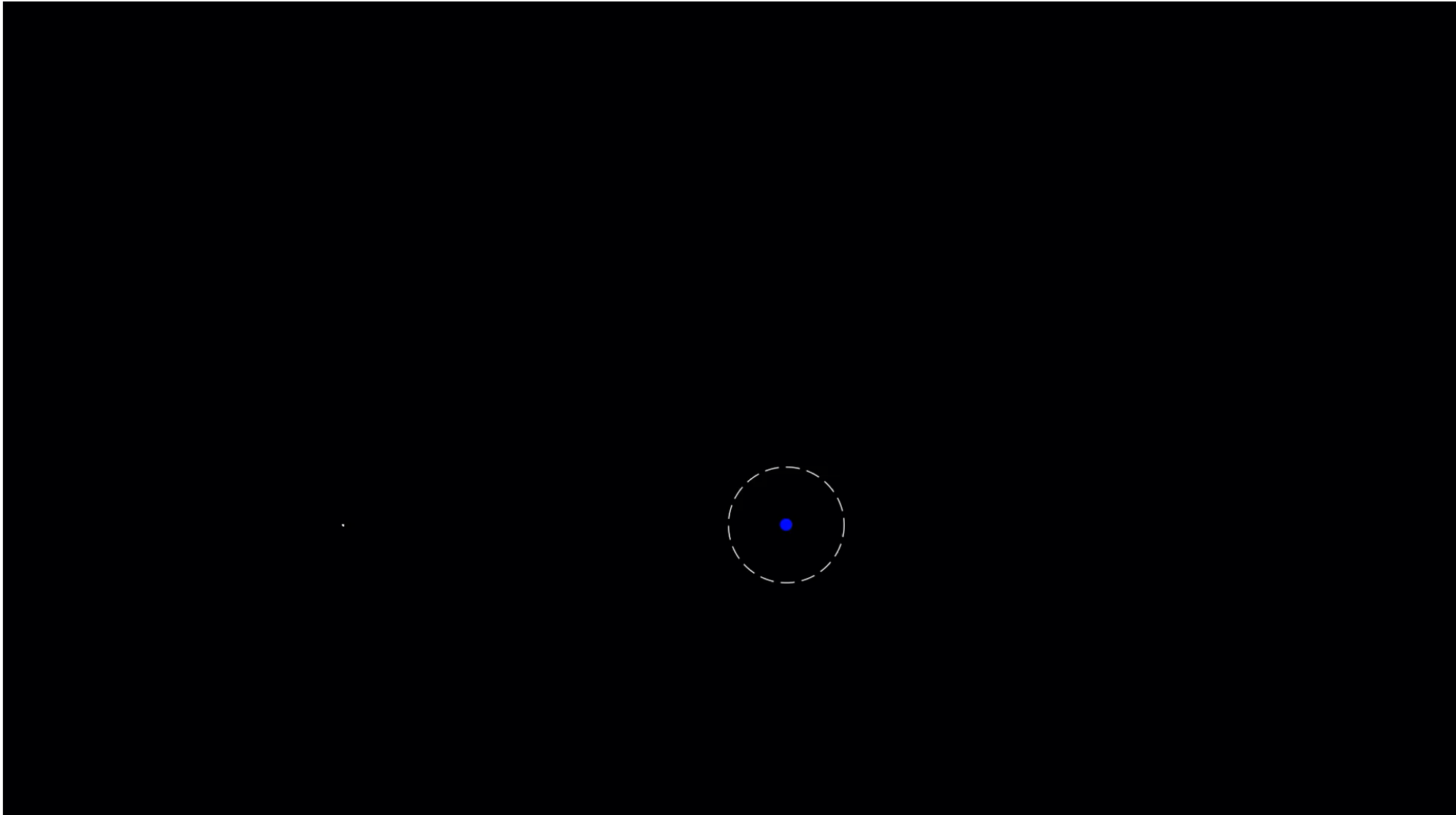
Tanja Petrushevska

gravitacijsko lečene supernove





plimska raztrganja zvezd v bližini masivnih črnih lukenj

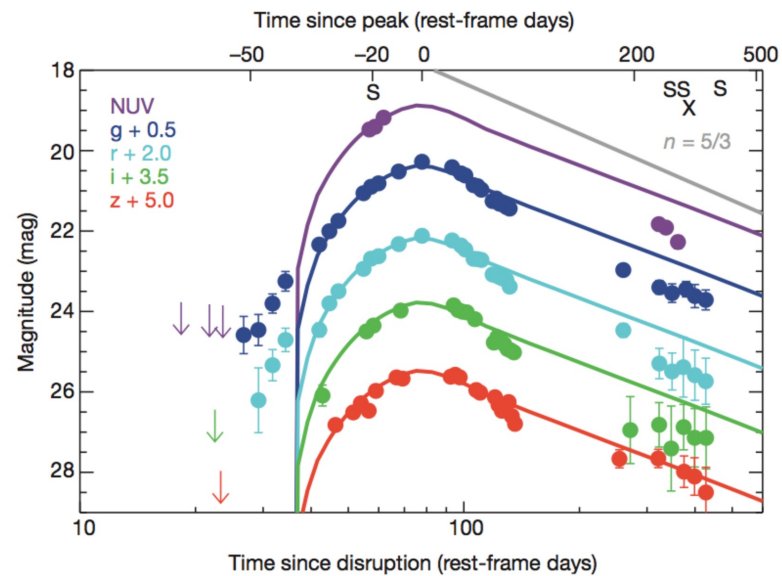


Taj Jankovič
HPC Vega

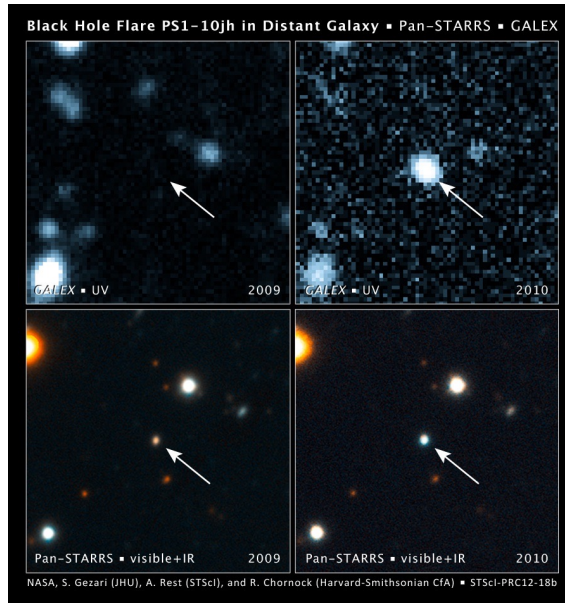


plimska raztrganja zvezd

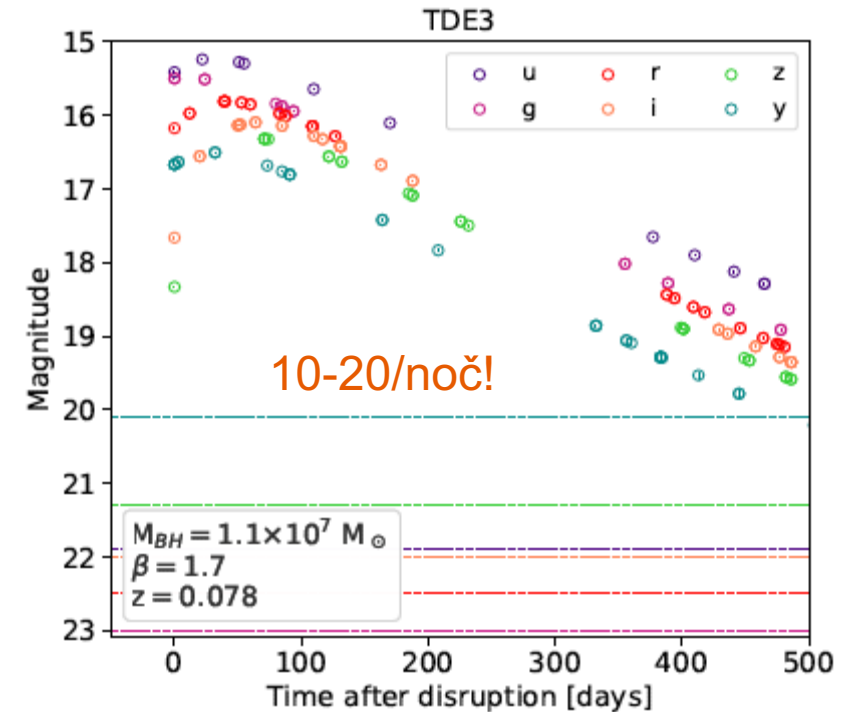
Pan-STARRS: PS1-10jh



Gezari et al., 2012



simulacija z LSST – Rubin. obs.:



Katja Bricman, AG, 2020

proučevanje “spečih” črnih lukenj v središčih galaksij – njihove lastnosti, okolica, vpliv na galaksijo ipd.



in-kind prispevka:

- **klasifikacija plimskih raztrganj**

EU Cofund SMASH 

HPC Vega

- **Lite IDAC**

20 MCPUhrs in 0.5 Petabytes of storage

full data rights



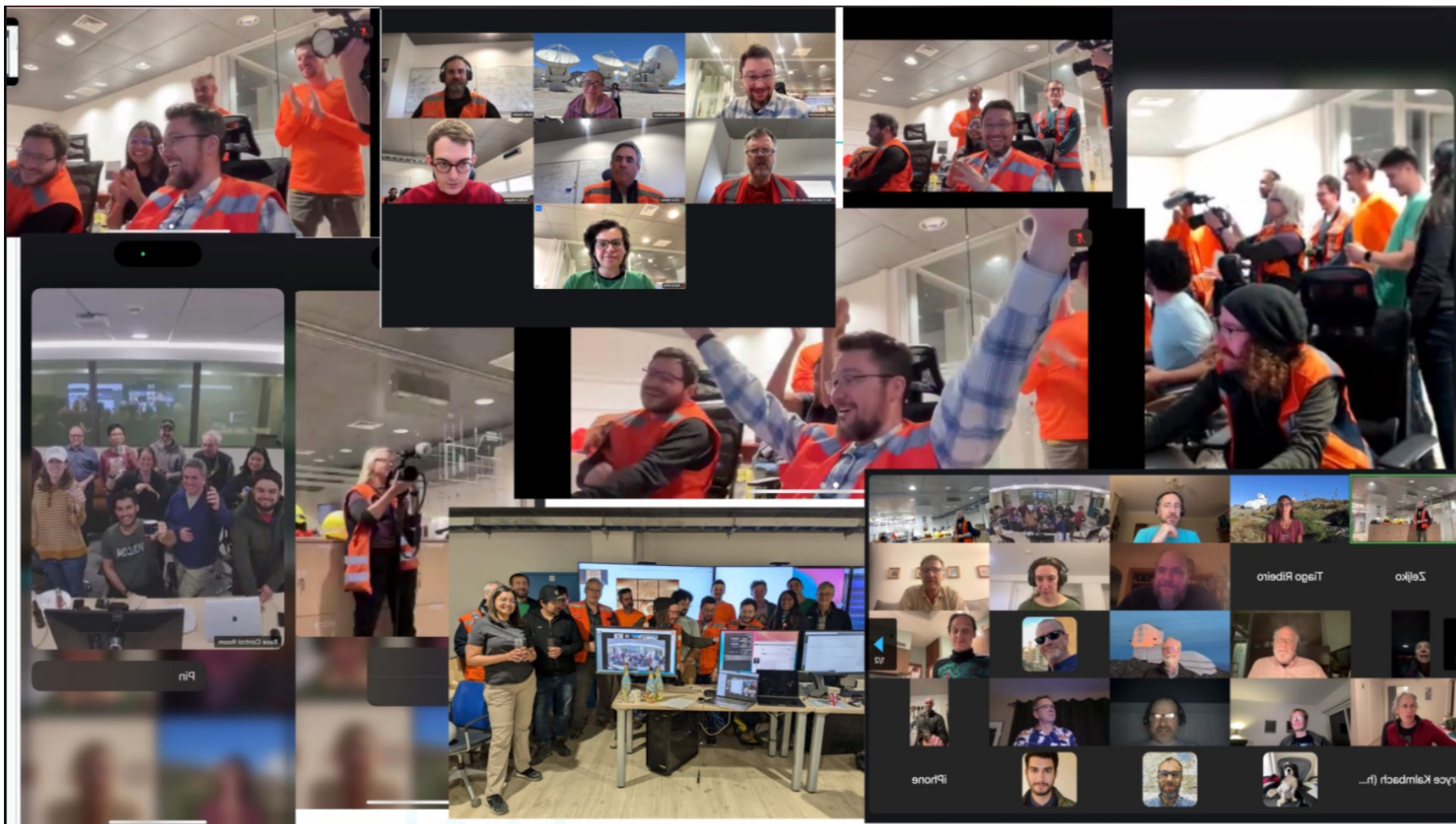


„almost there“



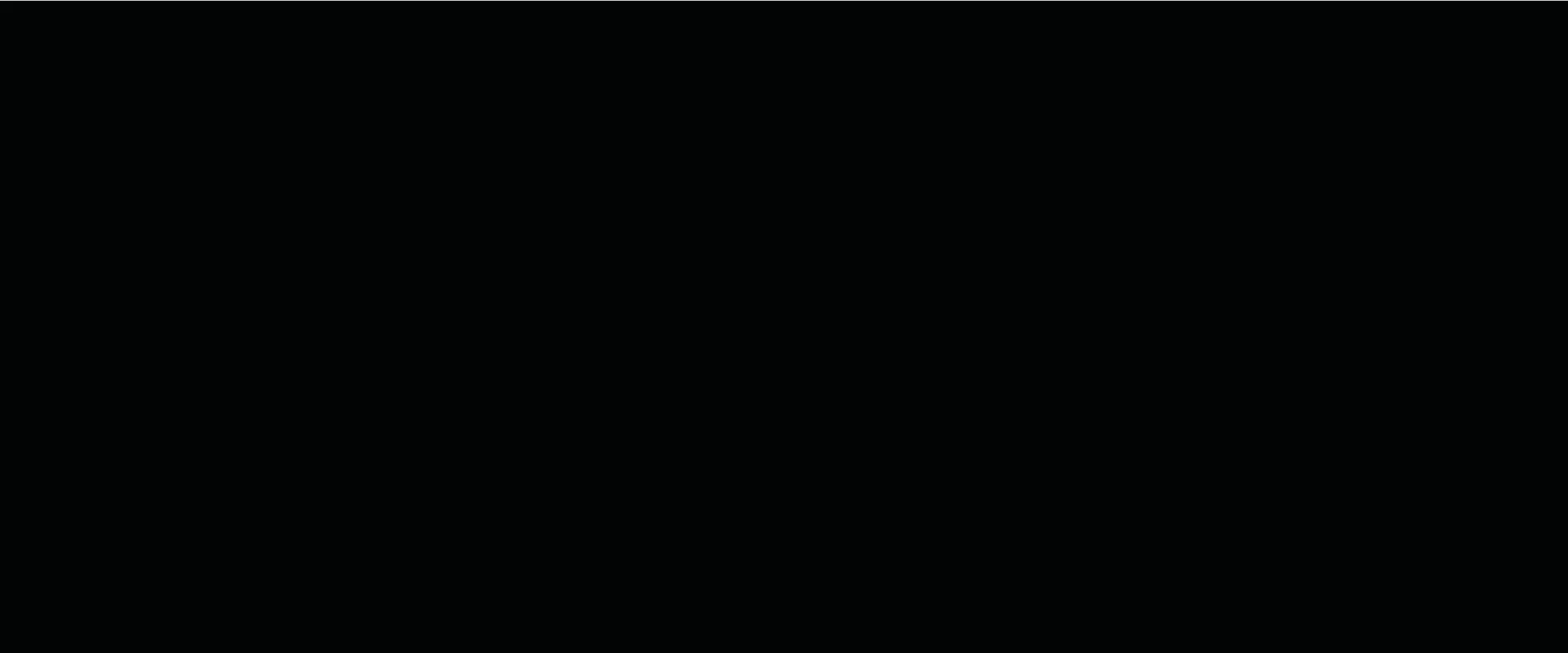


„first photon“



2025!







Financiranje

Projekt EuroCC 2 financira Evropska unija. Financiran je s sredstvi Skupnega podjetja za evropsko visokozmogljivo računalništvo (EuroHPC JU) ter Nemčije, Bolgarije, Avstrije, Hrvaške, Cipra, Češke republike, Danske, Estonije, Finske, Grčije, Madžarske, Irske, Italije, Litve, Latvije, Poljske, Portugalske, Romunije, Slovenije, Španije, Švedske, Francije, Nizozemske, Belgije, Luksemburga, Slovaške, Norveške, Turčije, Republike Severne Makedonije, Islandije, Črne gore in Srbije v okviru sporazuma o dodelitvi sredstev št. 101101903.

Delovanje Nacionalnega kompetenčnega centra SLING sofinancira Ministrstvo za visoko šolstvo, znanost in inovacije.

Medijski sponzor

**Računalniške
novice**

www.racunalske-novice.com



**Co-funded by
the European Union**



**REPUBLIKA SLOVENIJA
MINISTRSTVO ZA VISOKO ŠOLSTVO,
ZNANOST IN INOVACIJE**