BHTOM Intro

Łukasz Wyrzykowski
(pron. Woo-cash Vi-zhi-kov-ski)

Astronomical Observatory,
University of Warsaw, Poland

TEAM

https://gaia.astrouw.edu.pl

Warsaw University Astronomical Observatory

Łukasz Wyrzykowski
(staff)

Przemek Mikołajczyk
(staff)

Krzysztof Kotysz
(staff)

Collaborators:

Mariusz Gromadzki
(postdoc)

Milena Ratajczak
(postdoc)

UMK Toruń

Paweł Zieliński
(postdoc)

Kris A. Rybicki
(postdoc)

Katarzyna Kruszyńska
(postdoc)

Nada Ihanec
(PhD student)

Kornel Howil
(BSc student)

Uliana Pylypenko
(MSc student)

Zofia Kaczmarek
(PhD student)

Former contributors: Maja Jabłońska, Piotr Trzcionkowski, Kacper Raciborski

Funding:

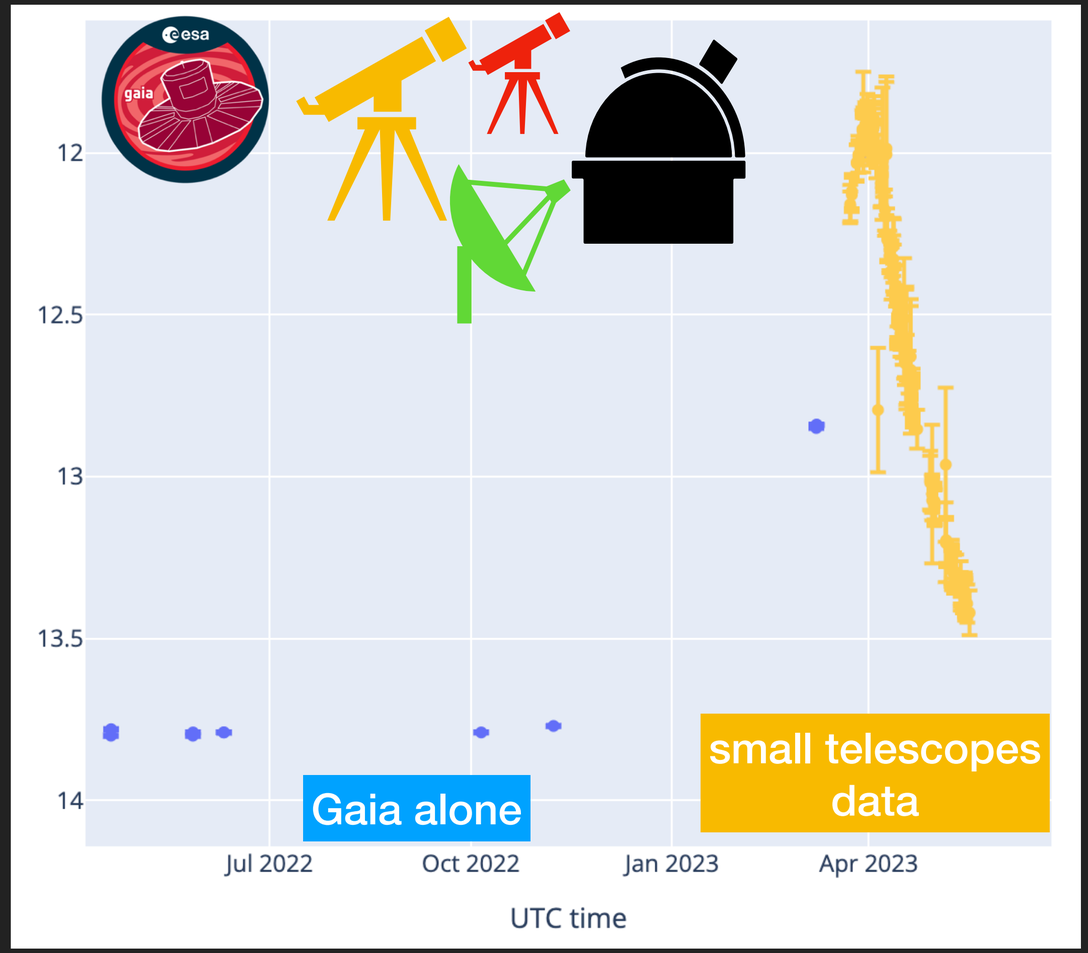
OPTICON-RADIONET PILOT GRANT

https://www.orp-h2020.eu/

- 15 M€ from EC H2020 for 2021-2025.02
- transnational access to optical and radio telescopes and excellence centres (VLTI)
- training via schools and workshops
- improvement of observing services and data access
- harmonisation of observing requests and proposal tools
- virtual access to facilities via coordinated hubs in time-domain

SMALL TELESCOPE FOR BIG SCIENCE

- part of OPTICON since 2013
- there are hundreds of small telescopes (0.3-2m) around the world
- owned by universities, research institutes, outreach institutions, private
- easy and cheap to buy, but hard to operate and use efficiently
- about 100 small telescopes have donated their observing time to our system for time-domain observations, primarily for Gaia microlensing events
- BHTOM system started in 2020 based on LCO's TOM Toolkit

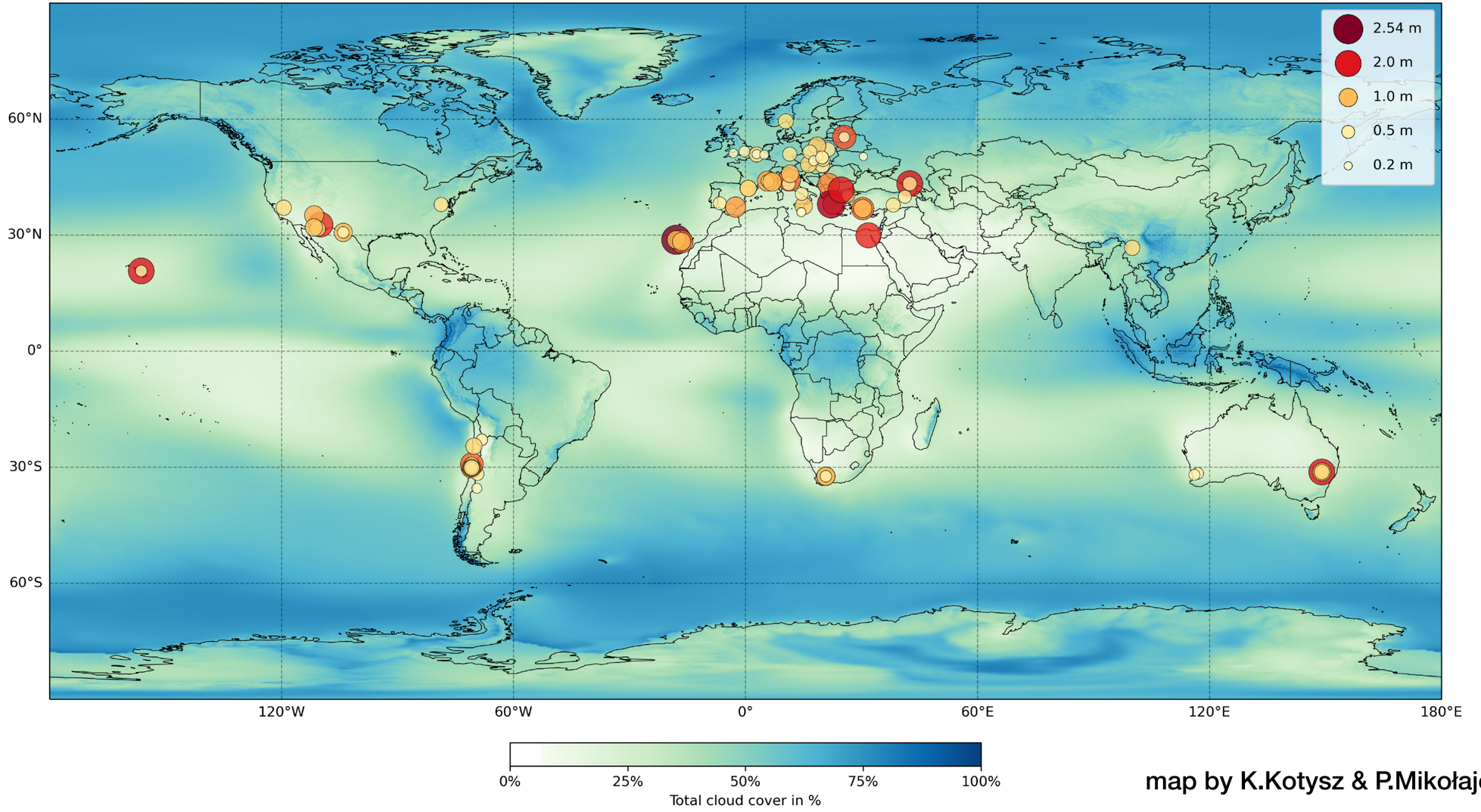


GAIA23BAY

BHTOM TELESCOPE NETWORK

- since 2013, built for Gaia Alerts

OPTICON RadioNet Pilot



map by K.Kotysz & P.Mikołajczyk

BHTOM TELESCOPE NETWORK

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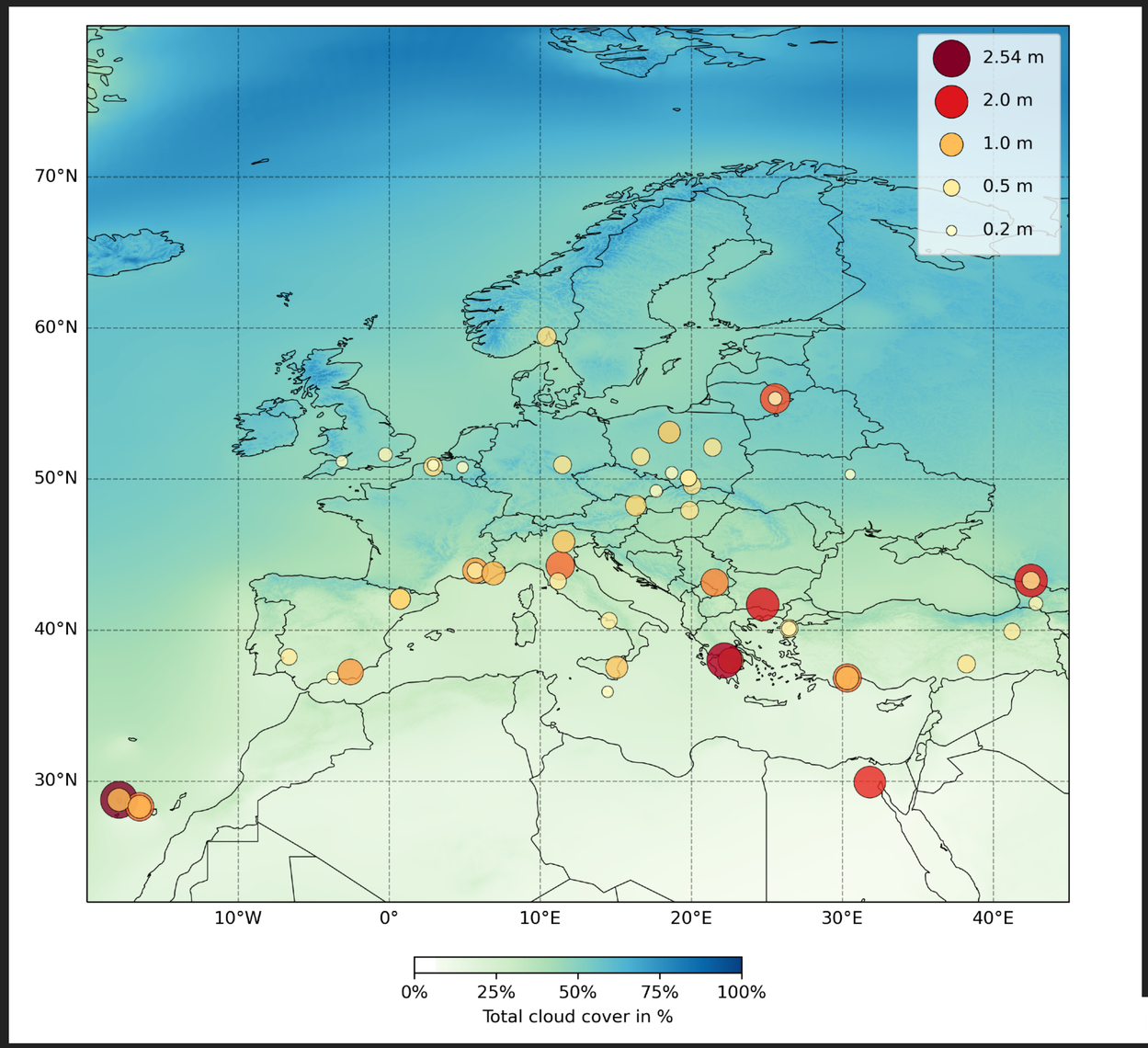

map by K.Kotysz & P.Mikołajczyk

BHTOM TELESCOPE NETWORK

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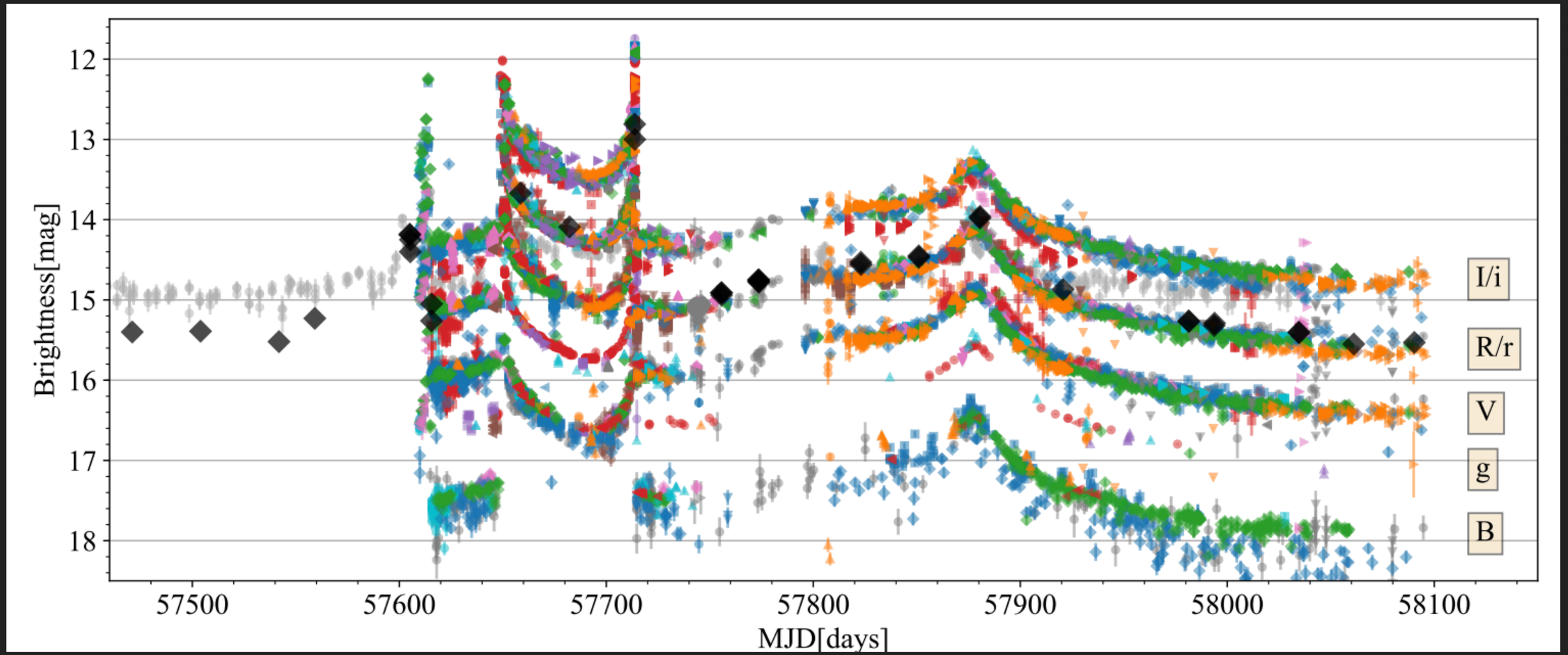
OPTICON RadioNet Pilot

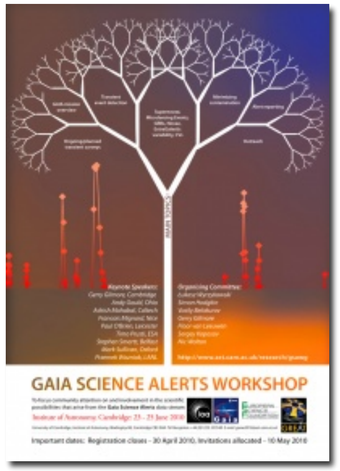
Gaia16aye

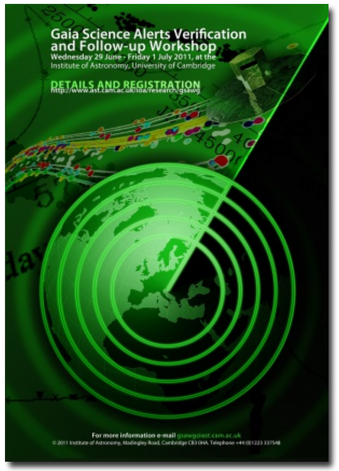


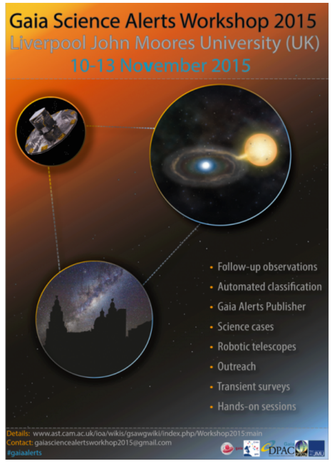
Wyrzykowski+2020

Wyrzykowski+2020

WORKSHOPS SINCE 2010



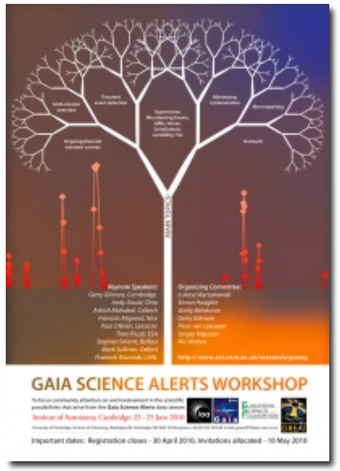


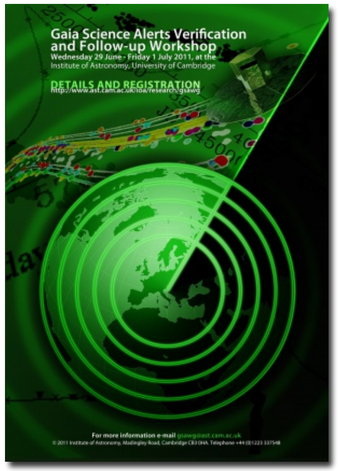


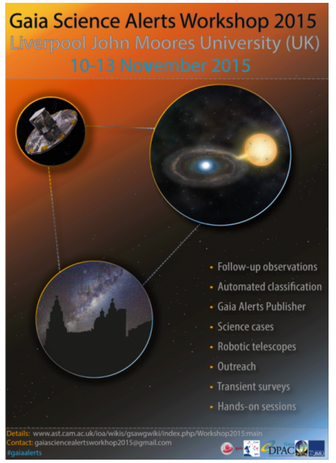
NAGRANIA ARCHIWALNE: HTTP://WWW.AST.CAM.AC.UK/IOA/WIKIS/GSAWGWIKI

Łukasz Wyrzykowski

WORKSHOPS SINCE 2010







Next one:
Crete, FORTH
30.Sep - 2.Oct 2024

NAGRANIA ARCHIWALNE: HTTP://WWW.AST.CAM.AC.UK/IOA/WIKIS/GSAWGWIKI

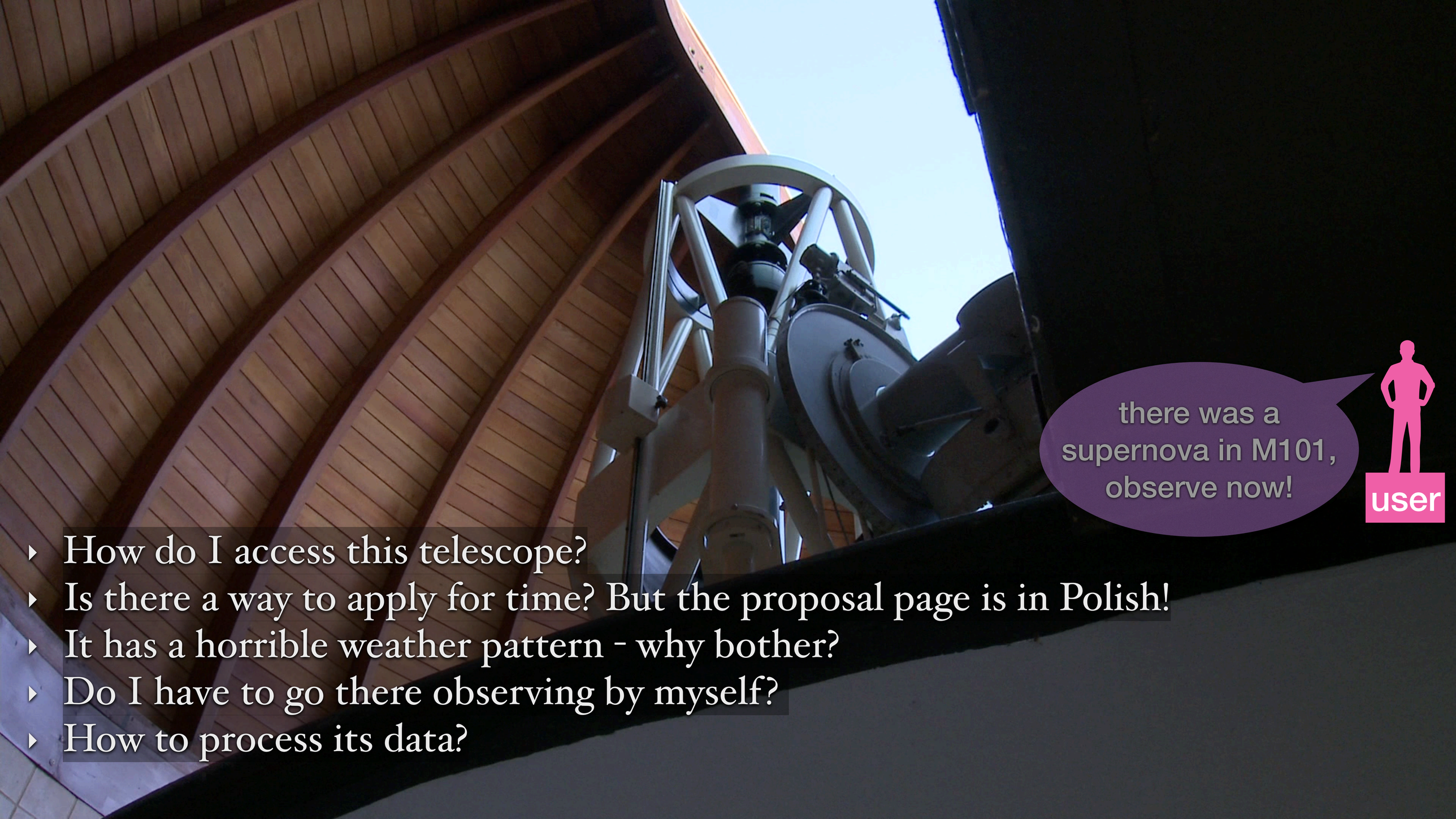
Łukasz Wyrzykowski

Ostrowik 60-cm telescope founded in 1973

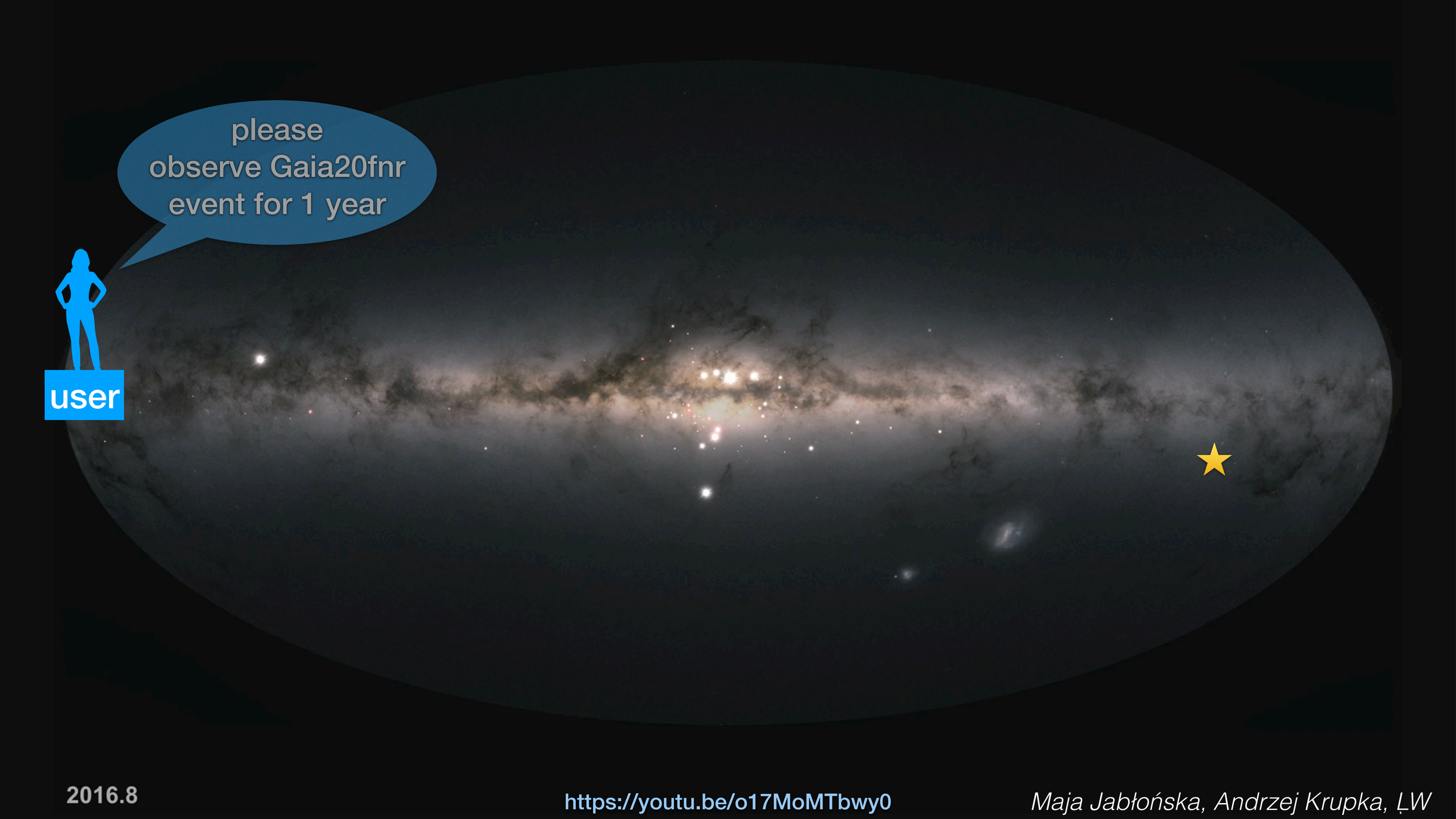
- What can I use my telescope for?
- I only have 30 clear nights a year… Let's close it and sell the forest…
- I can go observing any time but don't know what to observe
- I can process its data in an automated fashion
- My students use the telescope for their training but they lack ideas what to observe
- I need to justify the existence of the telescope with publications

Ostrowik 60-cm telescope founded in 1973


there was a supernova in M101, observe now!
user



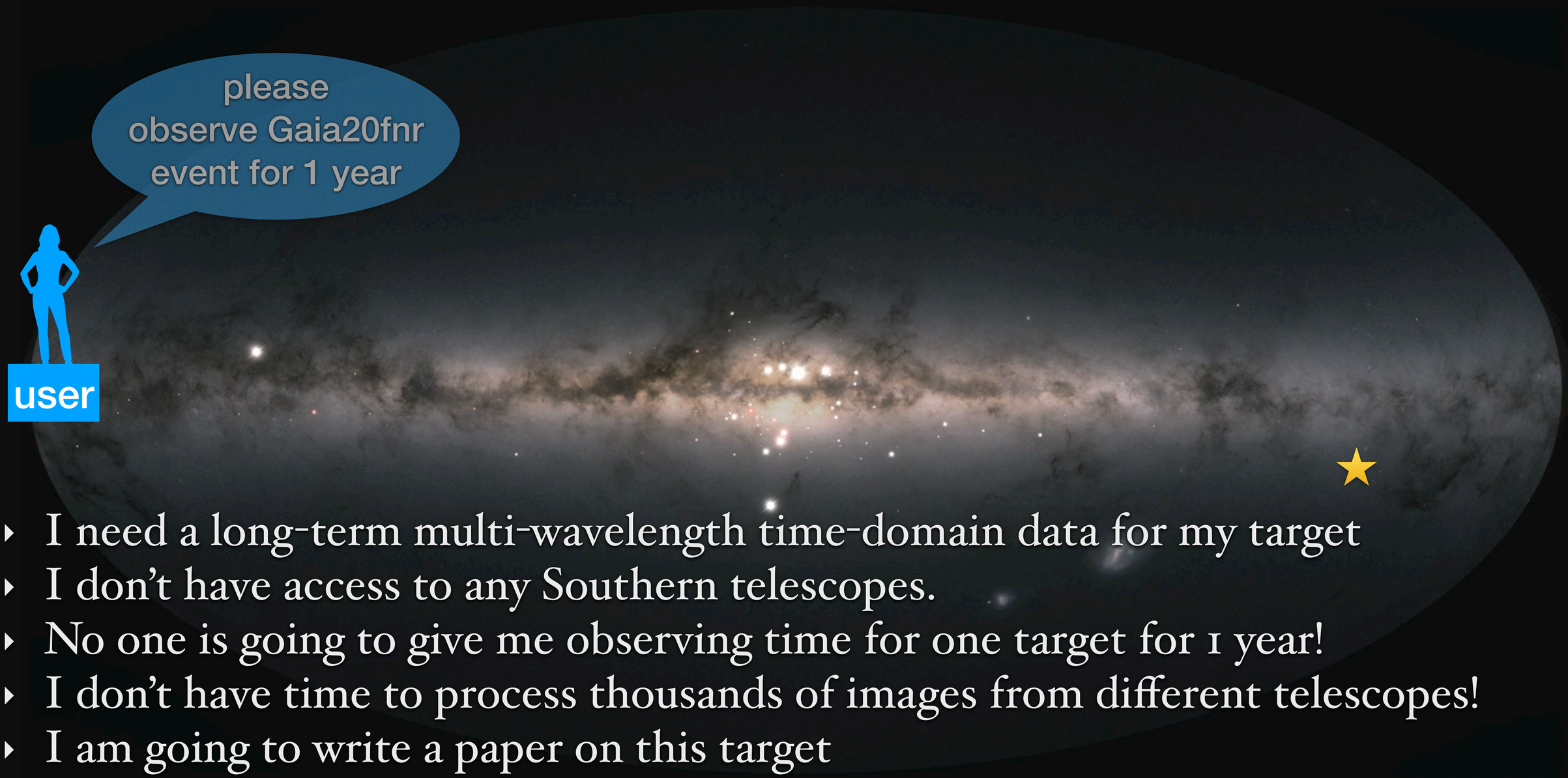
- How do I access this telescope?
- Is there a way to apply for time? But the proposal page is in Polish!
- It has a horrible weather pattern - why bother?
- Do I have to go there observing by myself?
- How to process its data?



2016.8

https://youtu.be/o17MoMTbwy0

Maja Jabłońska, Andrzej Krupka, ŁW



- I need a long-term multi-wavelength time-domain data for my target
- I don't have access to any Southern telescopes.
- No one is going to give me observing time for one target for 1 year!
- I don't have time to process thousands of images from different telescopes!
- I am going to write a paper on this target

2016.8

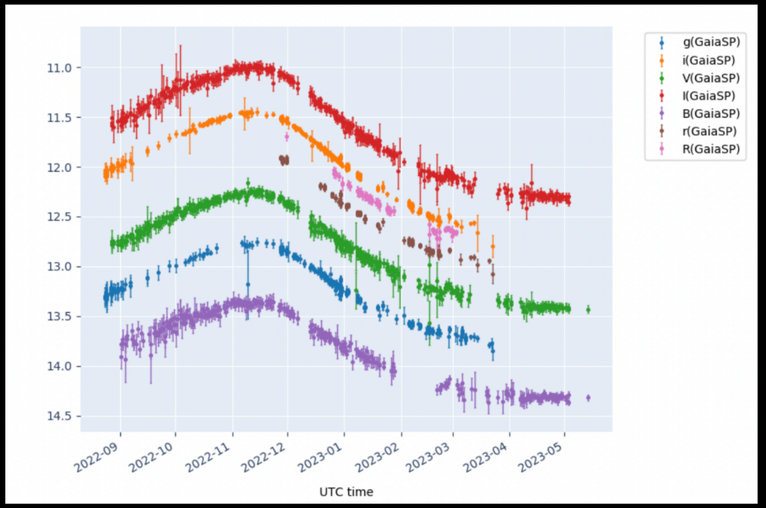
https://youtu.be/o17MoMTbwy0

Maja Jabłońska, Andrzej Krupka, ŁW

bhtom1

- started in 2020
- 199 users registered
- 87 observatories
- 108k images processed
- 1.4M data points stored, including the archival data
- 375 targets
- 10 papers published, at least 5 currently in prep.

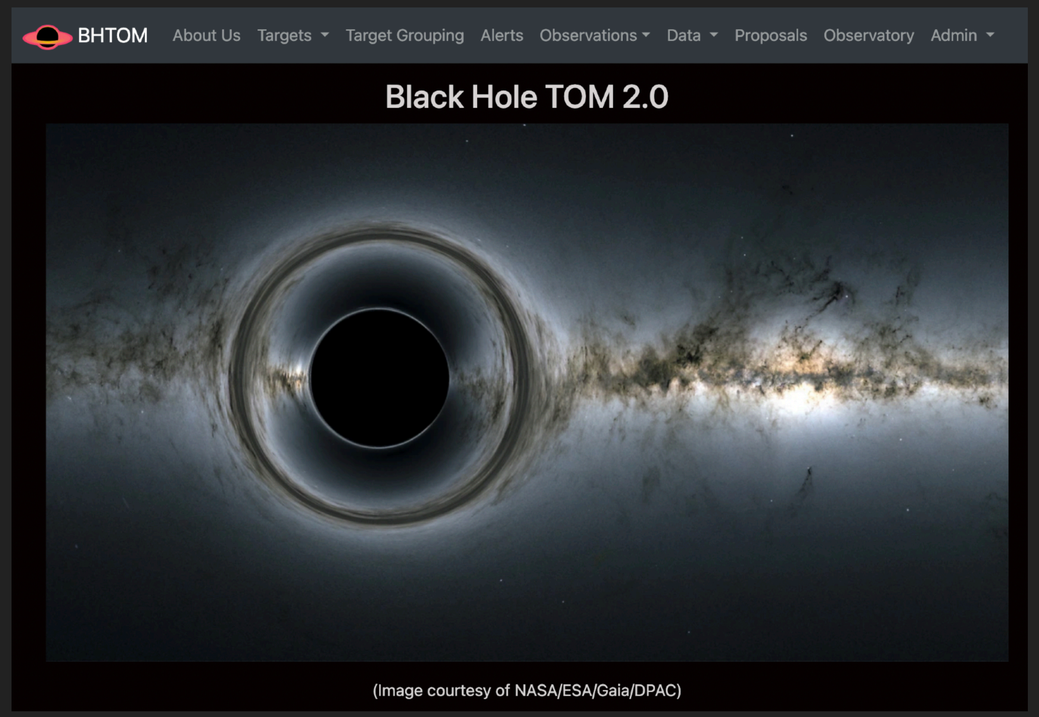
Event Name/Aliases	RA	Dec	Number of Observations	Last Gaia [mag]	Target Importance	Time from last obs [days]	Required Cadence [days]	Observing Priority	Sun distance [deg]
Gaia23air	90.60262499999999	-44.46998888888889	620	17.59	10.0	33.7	0.1	3374.0	90
Gaia23aiy	241.28055	-56.43674	185	19.68	10.0	18.4	0.1	1844.9	73
Gaia23bkf	281.41182	-5.72697	64	19.04	10.0	4.2	0.1	425.0	100
Gaia23cbf	132.06466666666665	-44.310538888888885	134	17.2	8.0	34.0	2.0	135.9	62
Gaia23aiw	246.06445	-46.8023	111	19.21	8.0	16.5	1.0	132.1	73
Gaia23bdq	287.47397	-30.19677	127	18.18	7.0	7.9	1.0	55.6	104
Gaia23ant	265.52345	-54.18721	113	17.0	1.0	15.5	100.0	0.2	86



http://bhtom.space

BLACK HOLE TARGET AND OBSERVATION MANAGER (BHTOM)

- tool for coordination of the network for time-domain observations
- processing of raw data from heterogenous units
- automation of data requests and imaging data processing
- querying time-domain archives
- data available to all registered users
- We will observe your target!

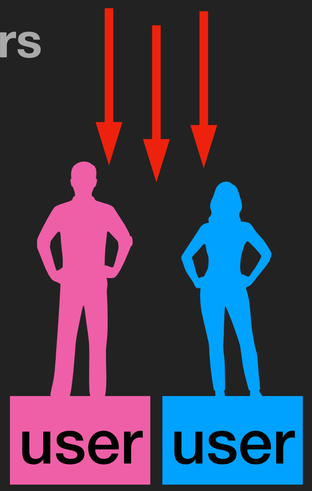


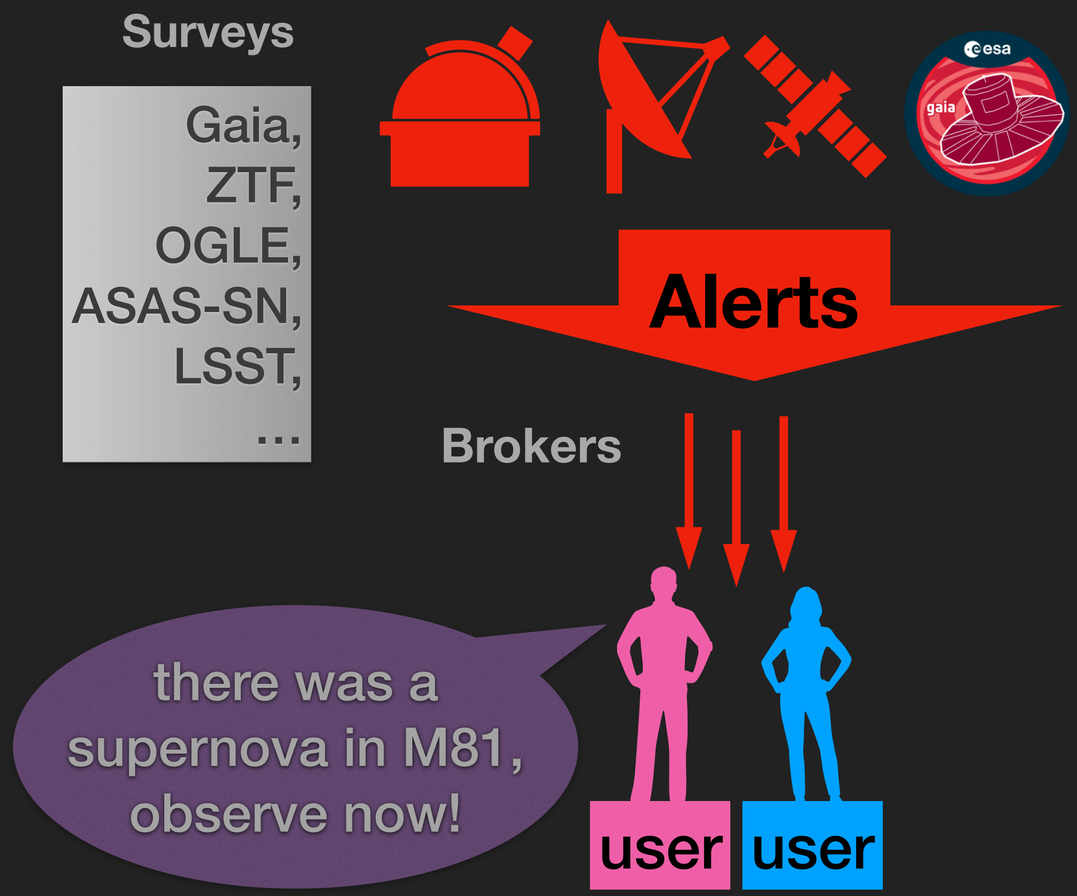
Surveys

Gaia,
ZTF,
OGLE,
ASAS-SN,
LSST,
…

Alerts

Brokers




Surveys
Gaia,
ZTF,
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…
esa
gaia
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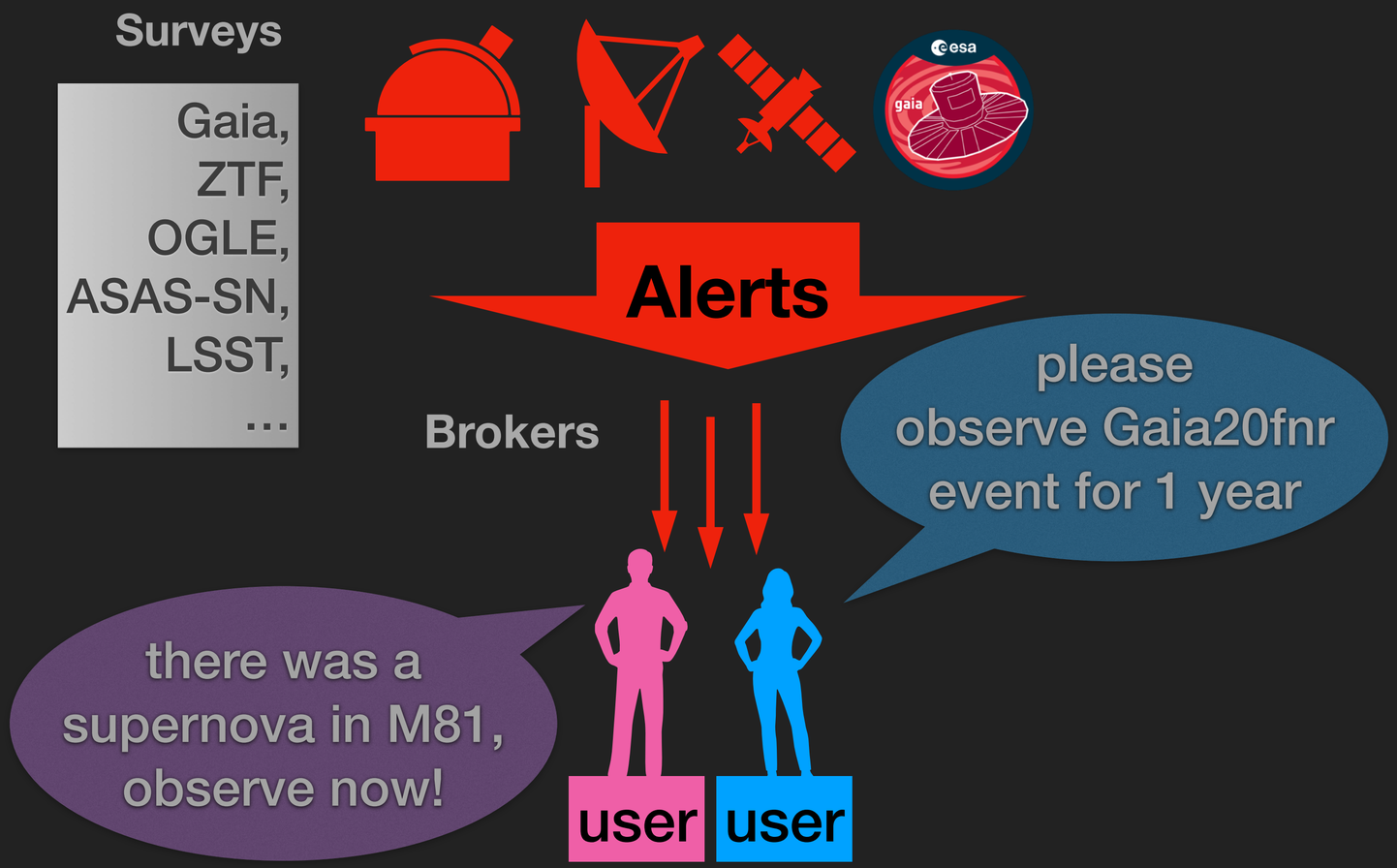
there was a supernova in M81, observe now!
user
user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please
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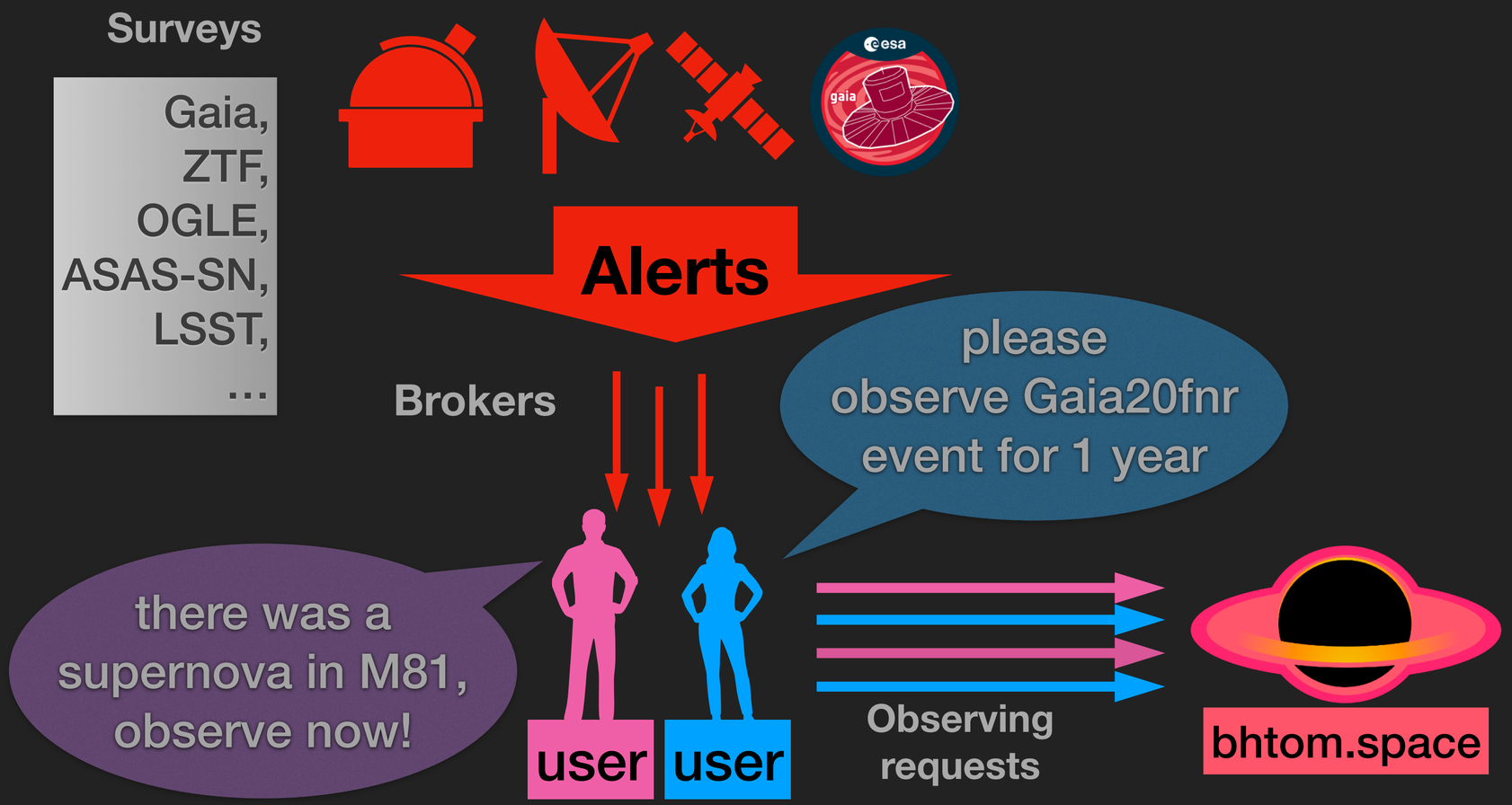
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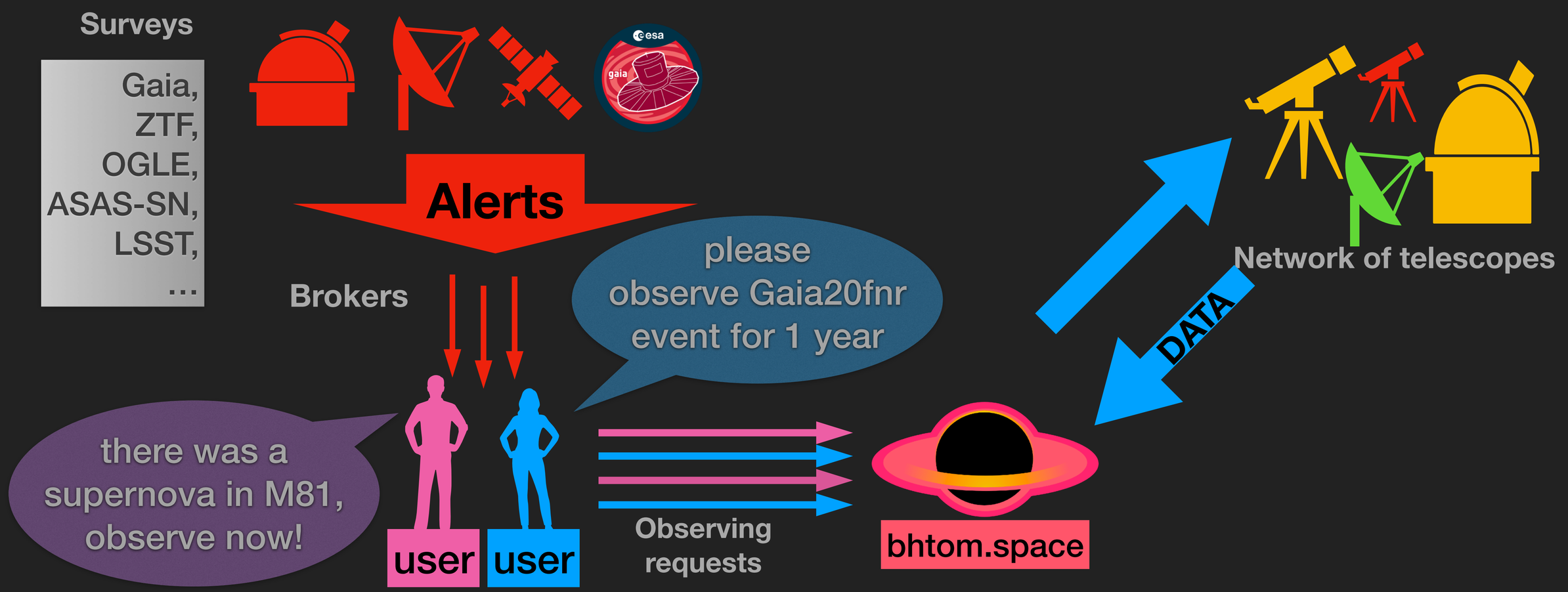
Observing
requests
bhtom.space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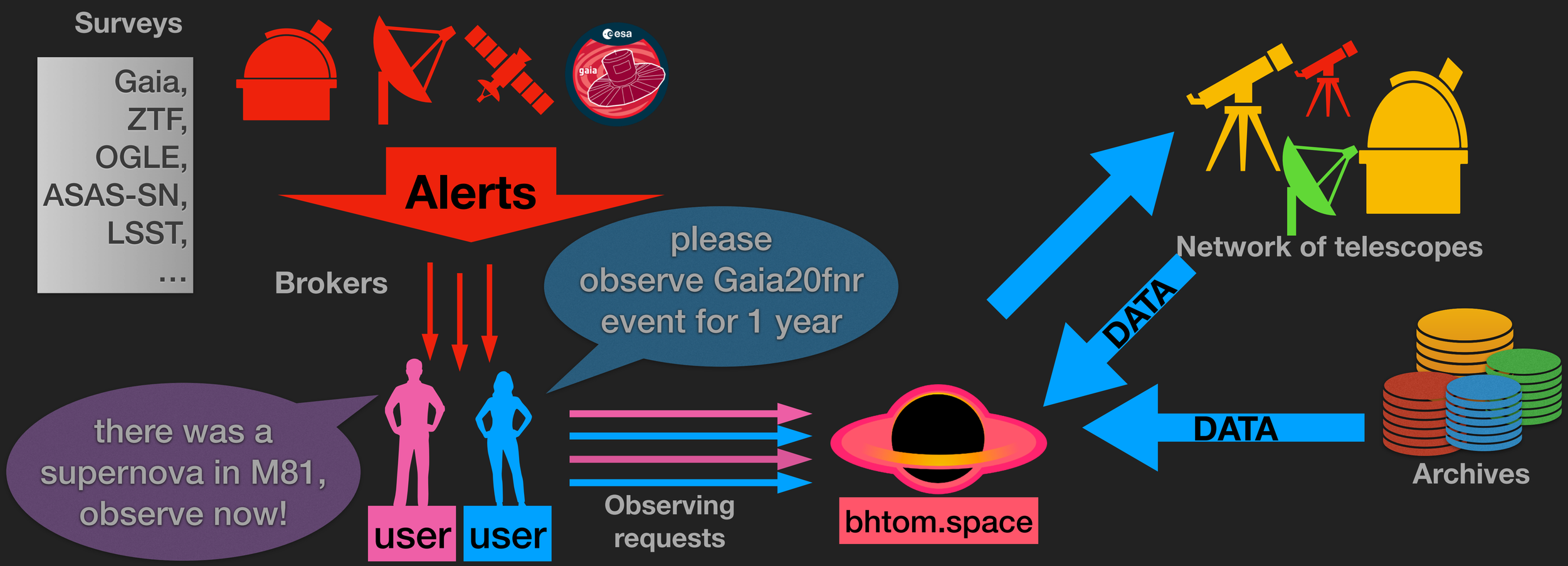
DATA
Network of telescopes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DATA
DATA
Archives

OPTICON RadioNet Pilot

Surveys

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user user

Observing requests

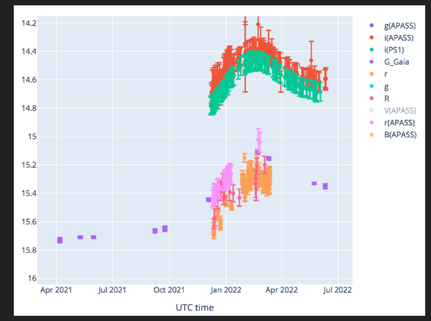
bhtom.space

Network of telescopes

DATA

DATA

Archives



Science-ready data products

OPTICON RadioNet Pilot

Surveys

Gaia,
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OGLE,
ASAS-SN,
LSST,
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user user

Observing requests

bhtom.space

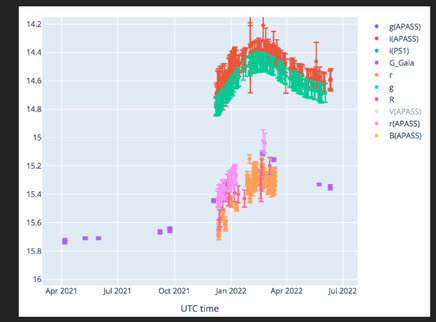
Network of telescopes

DATA

DATA

Archives

publications



Science-ready data products

OPTICON RadioNet Pilot

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bot bot

Observing requests

bhtom.space

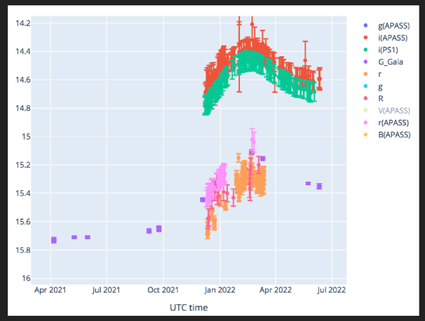
Network of telescopes

DATA

DATA

Archives

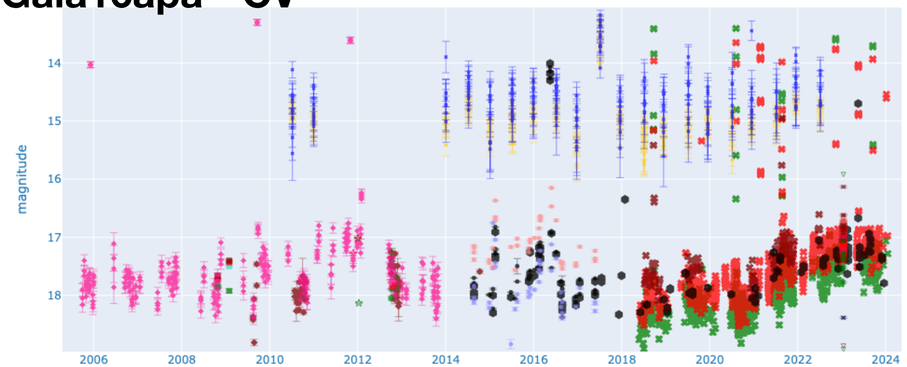
publications



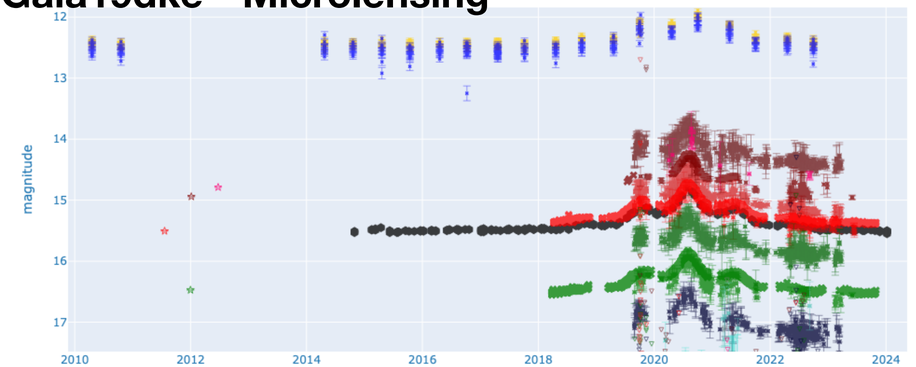
Science-ready data products

BHTOM – SCIENCE CASES

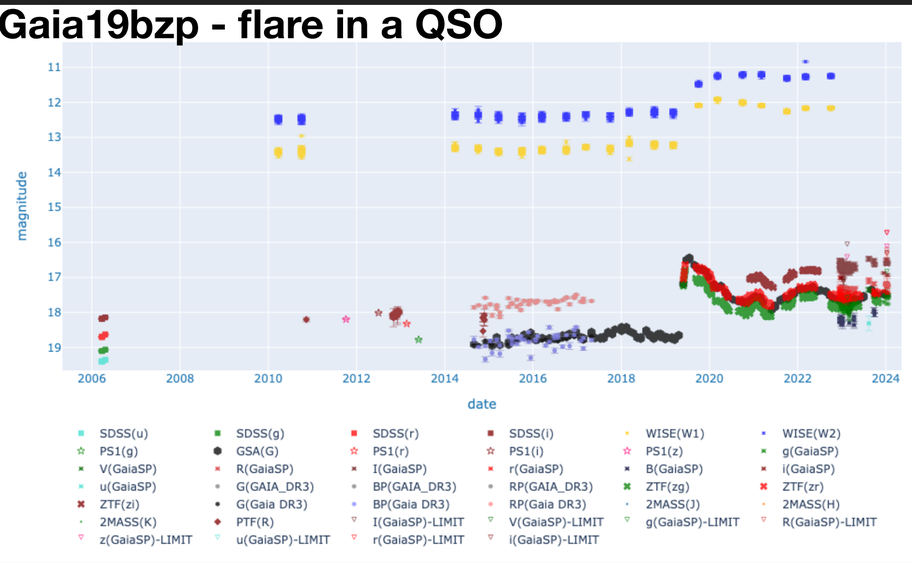
Gaia16apa - CV



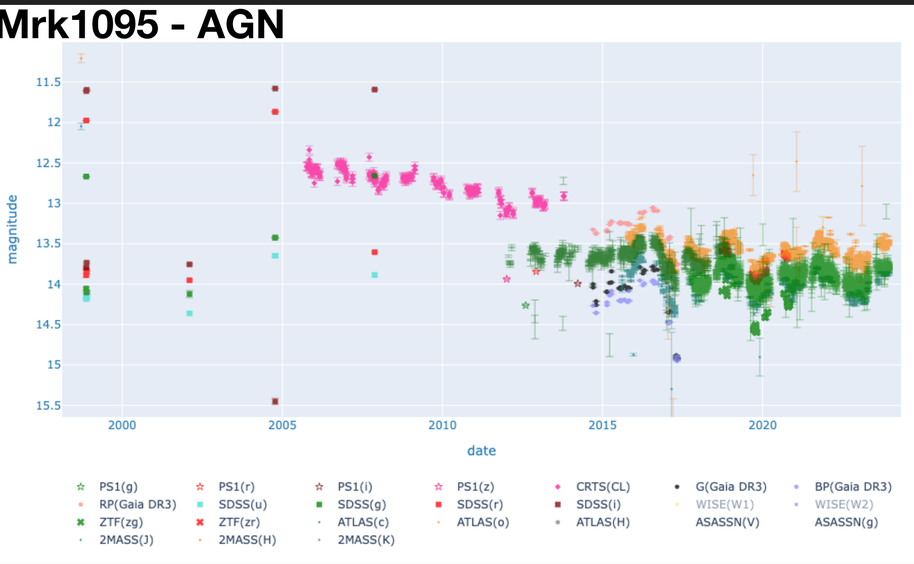
Gaia19dke - Microlensing



Gaia19bzp - flare in a QSO

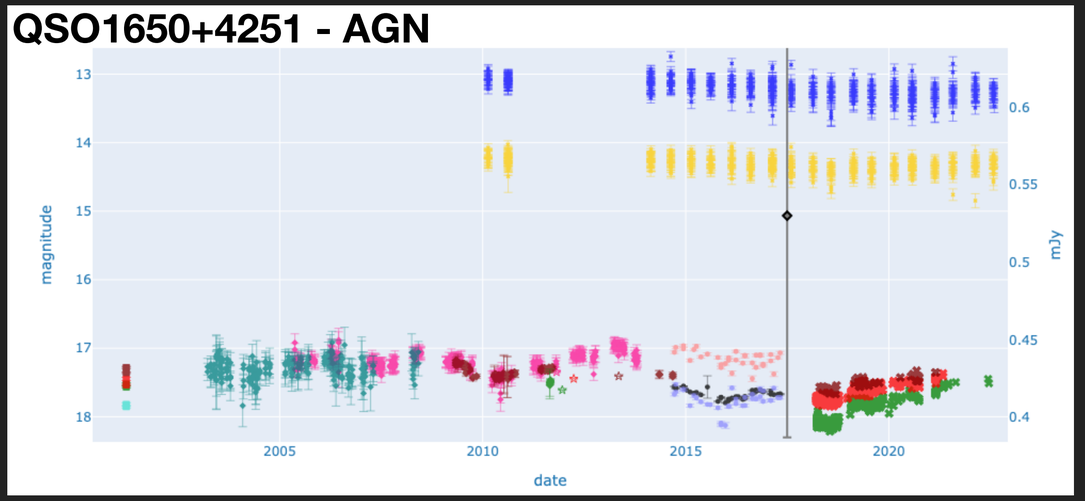


Mrk1095 - AGN



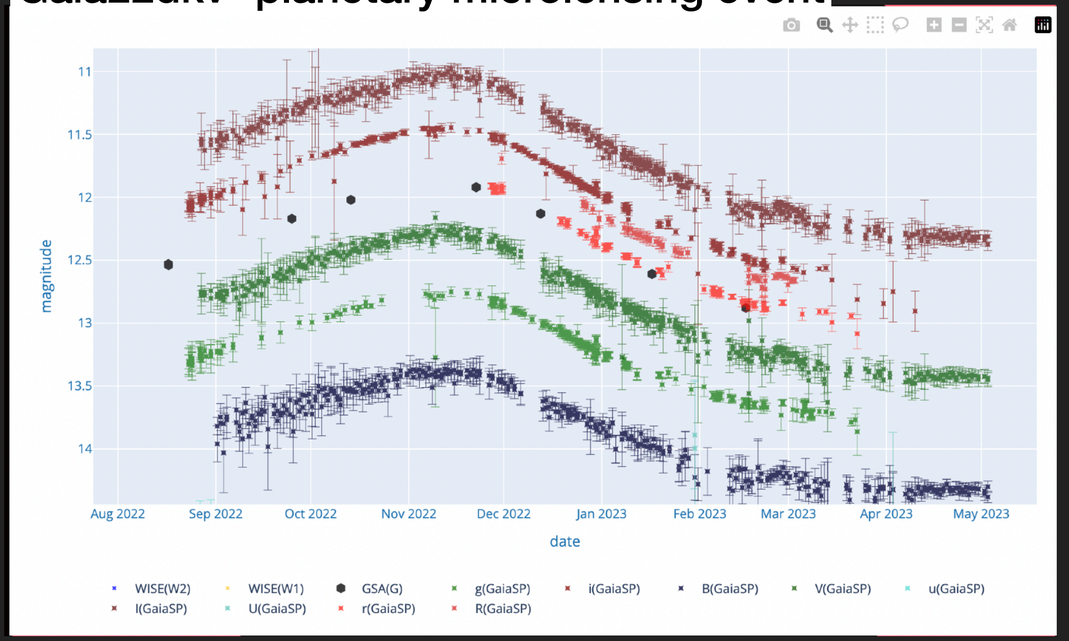
BHTOM – SCIENCE CASES

QSO1650+4251 - AGN



SN2023ixf

Gaia22dkv -planetary microlensing event



BHTOM – PUBLICATIONS

Monthly Notices of the ROYAL ASTRONOMICAL SOCIETY

MNRAS **515,** 1774–1787 (2022) https://doi.org/10.1093/mnras/stac1915
Advance Access publication 2022 July 12

Photometric and spectroscopic study of the burst-like brightening of two *Gaia*-alerted young stellar objects

Zsófia Nagy,[1,2★] Péter Ábrahám,[1,2,3] Ágnes Kóspál,[1,2,3,4] Sunkyung Park,[1,2] Michał Siwak,[1,2] Fernando Cruz-Sáenz de Miera,[1,2] Eleonora Fiorellino,[1,2,5] David García-Álvarez,[6,7] Zsófia Marianna Szabó,[1,2,8,9] Simone Antoniucci,[5] Teresa Giannini,[5] Alessio Giunta,[10] Levente Krisko Mária Kun,[1,2] Gábor Marton,[1,2] Attila Moór,[1,2] Brunella Nisini,[5] Andras Pál,[1,2,3] László Szaba Paweł Zieliński[11] and Łukasz Wyrzykowski[12]

The Astrophysical Journal, 899:130 (8pp), 2020 August 20

Gaia 18dvy: A New FUor in the Cygnus OB3 Association

E. Szegedi-Elek[1], P. Ábrahám[1,2], Ł. Wyrzykowski[3], M. Kun[1], Á. Kóspál[1,2,4], L. Chen[1], G. Marton[1,2], A. Moór[1,2], C. Kiss[1,2], A. Pál[1,2,5], L. Szabados[1], J. Varga[1,6], E. Varga-Verebélyi[1], C. Andreas[7], E. Bachelet[8], R. Bischoff[7], A. Bódi[1,9], E. Breedt[10], U. Burgaz[11,12], T. Butterley[13], J. M. Carrasco[14], V. Čepas[15], G. Damljanovic[16], I. Gezer[3], V. Godunova[17], M. Gromadzki[3], A. Gurgul[3], L. Hardy[18], F. Hildebrandt[7], S. Hoffmann[7], M. Hundertmark[19], N. Ihanec[3], R. Janulis[15], Cs. Kalup[1], Z. Kaczmarek[3], R. Könyves-Tóth[1], M. Krezinger[1], K. Kruszyńska[3], S. Littlefair[18], M. Maskoliūnas[15], L. Mészáros[1], P. Mikołajczyk[20], M. Mugrauer[7], H. Netzel[21], A. Ordasi[1], E. Pakštienė[15], K. A. Rybicki[3], K. Sárneczky[1], B. Seli[1], A. Simon[22], K. Šiškauskaitė[15], Á. Sódor[1], K. V. Sokolovsky[23,24,25], R. Szakáts[1], L. Tomasella[26], Y. Tsapras[19], K. Vida[1,2], J. Zdanavičius[15], M. Zieliński[3], P. Z

Full orbital solution for the binary system in the northern Galactic disc microlensing event Gaia16aye★

Łukasz Wyrzykowski[1,★★], P. Mróz[1], K. A. Rybicki[1], M. Gromadzki[1], Z. Kołaczkowski[45,79,★★★], M. Zieliński[1], P. Zieliński[1], N. Britavskiy[4,5], A. Gomboc[35], K. Sokolovsky[19,3,66], S.T. Hodgkin[6], L. Abe[89], G.F. Aldi[20,80], A. AlMannaei[62,100], G. Altavilla[72,7], A. Al Qasim[62,100], G.C. Anupama[8], S. Awiphan[9], E. Bachelet[63], V. Bakis[10], S. Baker[100], S. Bartlett[50], P. Bendjoya[11], K. Benson[100], I.F. Bikmaev[76,87], G. Birenbaum[12], N. Blagorodnova[24], S. Blanco-Cuaresma[15,74], S. Boeva[16], A.Z. Bonanos[19], V. Bozza[20,80], D.M. Bramich[62], I. Bruni[25], R.A. Burenin[84,85], U. Burgaz[21], T. Butterley[22], H. E. Caines[34], D. B. Caton[93], S. Calchi Novati[83], J.M. Carrasco[23], A. Cassan[29], V. Čepas[56], M. Cropper[100], M. Chruślińska[1,24], G. Clementini[25], A. Clerici[35], D. Conti[91], M. Conti[48], S. Cross[63], F. Cusano[25], G. Damljanovic[26], A. Dapergolas[19], G. D'Ago[81], J. H. J. de Bruijne[27], M. Dennefeld[29], V. S. Dhillon[30,4], M. Dominik[31], J. Dziedzic[1], O. Erece[32], M. V. Eselevich[86], H. Esenoglu[33], L. Eyer[74], R. Figuera Jaimes[31,53], S. J. Fossey[34], A. I. Galeev[76,87], S. A. Grebenev[84], A. C. Gupta[99], A. G. Gutaev[76], N. Hallakoun[12], A. Hamanowicz[1,36], C. Han[2], B. [illegible]erden[103], V. L. Hoette[95], K. [illegible]. Itoh[43], P. Iwanek[1], [illegible] Khamitov[44,76], Y.Kilic[32], J. [illegible], G. Latev[16], C-H. Lee[17,18], [illegible]. Manser[52], S. Mao[53], D. [illegible]ntjes[103], S. S. Melnikov[76,87], [illegible]hy[102], S. Nazarov[90], H. [illegible]laversa[6,74], A. Pandey[99], E. [illegible][96,97], J. K. T. Qvam[98], C. [illegible][89], G. Rixon[6], D. Roberts[47], [illegible]happee[69], R. Schmidt[41], Y. [illegible]es[34], B. van Soelen[103], Z. T. I. Szegedi[103], L. M. Tinjaca [illegible]ambsganss[41,42], I. P. van der [illegible]ov[76,87], D. G. Zhukov[76], J.

Lens mass estimate in the Galactic disk extreme parallax microlensing event Gaia19dke

M. Maskoliūnas[1], Ł. Wyrzykowski[2], K. Howil[2], K. A. Rybicki[2], P. Zieliński[3], Z. Kaczmarek[4], K. Kruszyńska[2], M. Jabłońska[2], J. Zdanavičius[1], E. Pakštienė[1], V. Čepas[1], P. J. Mikołajczyk[2,8], R. Janulis[1], M. Gromadzki[2], N. Ihanec[2], R. Adomavičienė[1], K. Šiškauskaitė[1], M. Bronikowski[2,7], P. Sivak[2], A. Stankevičiūtė[2], M. Sitek[2], M. Ratajczak[2], U. Pylypenko[2], I. Gezer[5], S. Awiphan[9], E. Bachelet[10], K. Bąkowska[3], R. P. Boyle[12], V. Bozza[32,33], S. M. Brincat[13], U. Burgaz[11], T. Butterley[29], J. M. Carrasco[14], A. Cassan[38], F. Cusano[15], G. Damljanovic[6], V. S. Dhillon[22], M. Dominik[39], F. Dubois[16], H. H. Esenoglu[17], R. Figuera Jaimes[34], A. Fukui[19], C. Galdies[20], A. Garofalo[15], V. Godunova[21], T. Güver[17,18], J. Heidt[22], M. Hundertmark[36], I. Izviekova[3], B. Joachimczyk[3], M.K. Kamińska[39],K. Kamiński[39],S. Kaptan[17,18], T. Kvernadze[24], O. Kvaratskhelia[24], S. Littlefair[22], O. Michniewicz[24], N. Nakhatutai[35], W. Ogłoza[42], J. M. Olszewska[39], M. Polińska[39], A. Popowicz[25], J. K. T. Qvam[26],M. Radziwonowicz[2], A. Słowikowska[37,3], A. Simon[30,31], E. Sonbas[40,41] M. Stojanovic[6] Y. Tsapras[36],S. Vanaverbeke[16], R. W. Wilson[29], M. Zejmo[24], S. Zola[28],

Single lens mass measurement in the high magnification microlensing event Gaia19bld located in the Galactic Disk

K. A. Rybicki,★[1] Ł. Wyrzykowski,[1] E. Bachelet,[2] A. Cassan,[3] P. Zieliński,[1] A. Gould,[4,5] S. Calchi Novati,[6] J.C. Yee,[7] Y.-H. Ryu,[8] M. Gromadzki,[1] P. Mikołajczyk,[9] N. Ihanec,[1] K. Kruszyńska,[1] F.-J. Hambsch,[10,11] S. Zola,[12] S. J. Fossey,[13] S. Awiphan,[14] N. Nakharutai,[15] F. Lewis,[16,17] F. Olivares E.,[18] S. Hodgkin,[19] A. Delgado,[19] E. Breedt,[19] D. L. Harrison,[19,20] M. van Leeuwen,[19] G. Rixon,[19] T. Wevers,[19] A. Yoldas,[19] A. Udalski,[1] M. K. Szymański,[1] I. Soszyński,[1] P. Pietrukowicz,[1] S. Kozłowski,[1] J. Skowron,[1] R. Poleski,[1] K. Ulaczyk,[21,1] P. Mróz,[1,22] P. Iwanek,[1] M. Wrona,[1] R.A. Street,[2] Y. Tsapras,[23] M. Hundertmark Gaudi,[5] C. Henderson,[6] Y. Shvartzvald,[25] W. Zang

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Jujia Zhang,[1,2,3,4★] Xiaofeng Wang,[5,6] József Vinkó[7,8,9] Qian Zhai,[1,2,3,4] Tianmeng Zhang,[10] Alexei V. Filippenko,[12,13] Thomas G. Brink,[12] WeiKang Zheng,[12] Łukasz Wyrzykowski,[14] Przemysław Mikołajczyk,[14] Fang Huang,[15] Xinhan Zhang,[5] Huijuan Wang,[10,11] James A. Bódi,[7,18] G. Csörnyei,[7,8] O. Hanyecz,[7] I R. Könyves-Tóth,[7,8] A. Ordasi,[7] A. Pál,[7,8] G. Zsidi[7,8,19]

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Ban, M.[1], Voloshyn, P.[2,3], Adomavičienė, R.[4], Bachelet, E.[5,6], Bozza, V.[7,8], Brincat, S. M.[9], Bruni, I.[10], Burgaz, U.[11], Carrasco, J. M.[12], Cassan, A.[5], Čepas, V.[4], Dominik, M.[13], Dubois, F.[14], Figuera Jaimes, R.[15], Fukui, A.[16,17], Galdies, C.[18,19], Garofalo, A.[10], Hundertmark, M.[20], Kruszyńska, K.[1], Kulijanishvili, V.[21], Kvernadze, T.[21], Logie, L.[14], Maskoliūnas, M.[4], Mikołajczyk, P. J.[1,22], Mróz, P.[1], Narita, N.[16,17,23], Pakštienė, E.[4], Peloton, J.[3], Poleski, R.[1], Qvam, J. K. T.[24], Rau, S.[14], Rota, P.[7,8] Rybicki, K. A.[1,25], Street, R. A.[26], Tsapras, Y.[20], Vanaverbeke, S.[14], Wambsganss, J.[20], Wyrzykowski, Ł.[1], Zdanavičius, J.[4], and Zieliński, P.[27]

The *Gaia* alerted fading of the FUor-type star Gaia21elv

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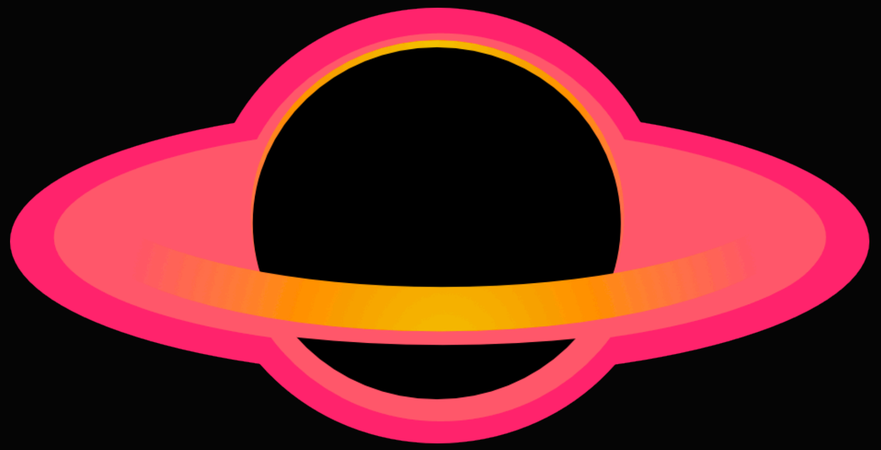

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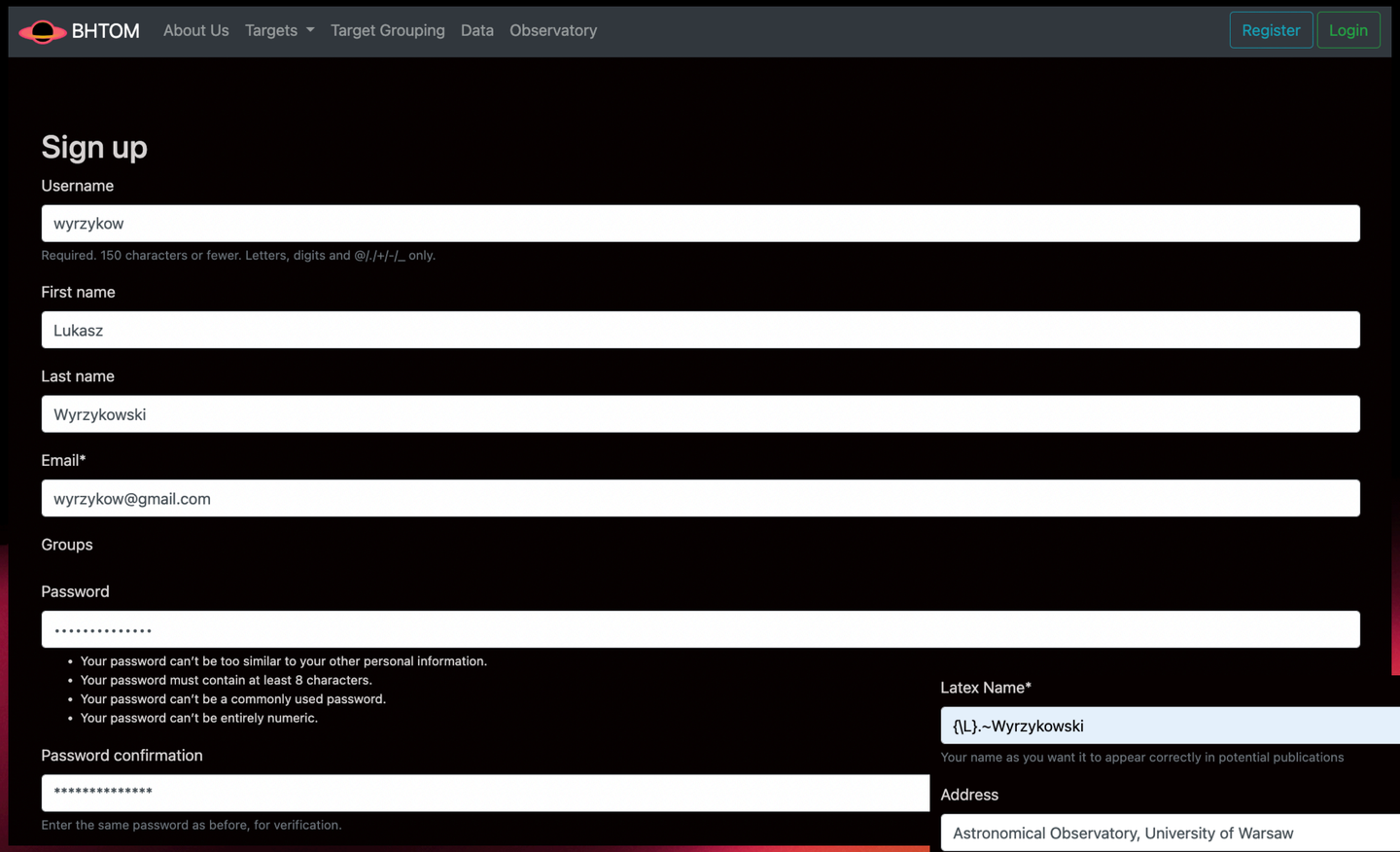

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Astronomy & Astrophysics manuscript no. pap16aye
October 30, 2019

Full orbital solution for the binary system in the northern Galactic disc microlensing event Gaia16aye⋆

Łukasz Wyrzykowski[1,★★], P. Mróz[1], K. A. Rybicki[1], M. Gromadzki[1], Z. Kołaczkowski[45,79,★★★], M. Zieliński[1], P. Zieliński[1], N. Britavskiy[4,5], A. Gomboc[35], K. Sokolovsky[19,3,66], S.T. Hodgkin[6], L. Abe[89], G.F. Aldi[20,80], A. AlMannaei[62,100], G. Altavilla[72,7], A. Al Qasim[62,100], G.C. Anupama[8], S. Awiphan[9], E. Bachelet[63], V. Bakış[10], S. Baker[100], S. Bartlett[50], P. Bendjoya[11], K. Benson[100], I.F. Bikmaev[76,87], G. Birenbaum[12], N. Blagorodnova[24], S. Blanco-Cuaresma[15,74], S. Boeva[16], A.Z. Bonanos[19], V. Bozza[20,80], D.M. Bramich[62], I. Bruni[25], R.A. Burenin[84,85], U. Burgaz[21], T. Butterley[22], H. E. Caines[34], D. B. Caton[93], S. Calchi Novati[83], J.M. Carrasco[23], A. Cassan[29], V. Čepas[56], M. Cropper[100], M. Chruślińska[1,24], G. Clementini[25], A. Clerici[35], D. Conti[91], M. Conti[48], S. Cross[63], F. Cusano[25], G. Damljanovic[26], A. Dapergolas[19], G. D'Ago[81], J. H. J. de Bruijne[27], M. Dennefeld[29], V. S. Dhillon[30,4], M. Dominik[31], J. Dziedzic[1], O. Erece[32], M. V. Eselevich[86], H. Esenoglu[33], L. Eyer[74], R. Figuera Jaimes[31,53], S. J. Fossey[34], A. I. Galeev[76,87], S. A. Grebenev[84], A. C. Gupta[99], A. G. Gutaev[76], N. Hallakoun[12], A. Hamanowicz[1,36], C. Han[2], B. Handzlik[37], J. B. Haislip[94], L. Hanlon[102], L. K. Hardy[30], D. L. Harrison[6,88], H.J. van Heerden[103], V. L. Hoette[95], K. Horne[31], R. Hudec[39,76,40], M. Hundertmark[41], N. Ihanec[35], E. N. Irtuganov[76,87], R. Itoh[43], P. Iwanek[1], M.D.Jovanovic[26], R. Janulis[56], M. Jelínek[39], E. Jensen[92], Z. Kaczmarek[1], D. Katz[101], I.M. Khamitov[44,76], Y.Kilic[32], J. Klencki[1,24], U. Kolb[47], G. Kopacki[45], V. V. Kouprianov[94], K. Kruszyńska[1], S. Kurowski[37], G. Latev[16], C-H. Lee[17,18], S. Leonini[48], G. Leto[49], F. Lewis[50,59], Z. Li[63], A. Liakos[19], S. P. Littlefair[30], J. Lu[51], C.J. Manser[52], S. Mao[53], D. Maoz[12], A.Martin-Carrillo[102], J. P. Marais[103], M. Maskoliūnas[56], J. R. Maund[30], P. J. Meintjes[103], S. S. Melnikov[76,87], K. Ment[41], P. Mikołajczyk[45], M. Morrell[47], N. Mowlavi[74], D. Moździerski[45], D. Murphy[102], S. Nazarov[90], H. Netzel[1,79], R. Nesci[67], C.-C. Ngeow[54], A. J. Norton[47], E. O. Ofek[55], E. Pakštienė[56], L. Palaversa[6,74], A. Pandey[99], E. Paraskeva[19,78], M. Pawlak[1,65], M. T. Penny[57], B. E. Penprase[58], A. Piascik[59], J. L. Prieto[96,97], J. K. T. Qvam[98], C. Ranc[70], A. Rebassa-Mansergas[60,71], D. E. Reichart[94], P. Reig[61,75], L. Rhodes[30], J.-P. Rivet[89], G. Rixon[6], D. Roberts[47], P. Rosi[48], D.M. Russell[62], R. Zanmar Sanchez[49], G. Scarpetta[20,82], G. Seabroke[100], B. J. Shappee[69], R. Schmidt[41], Y. Shvartzvald[13,14], M. Sitek[1], J. Skowron[1], M. Śniegowska[1,77,79], C. Snodgrass[46], P. S. Soares[34], B. van Soelen[103], Z. T. Spetsieri[19,78], A. Stankevičiūtė[1], I. A. Steele[59], R. A. Street[63], J. Strobl[39], E. Strubble[95], H. Szegedi[103], L. M. Tinjaca Ramirez[48], L. Tomasella[64], Y. Tsapras[41], D. Vernet[11], S. Villanueva Jr.[57], O. Vince[26], J. Wambsganss[41,42], I. P. van der Westhuizen[103], K. Wiersema[52,68], D. Wium[103], R. W. Wilson[22], A. Yoldas[6], R.Ya. Zhuchkov[76,87], D. G. Zhukov[76], J. Zdanavičius[56], S. Zoła[37,38], and A. Zubareva[73,3]

(Affiliations can be found after the references)

[1] Warsaw University Astronomical Observatory, Al. Ujazdowskie 4, 00-478 Warszawa, Poland
[2] Department of Physics, Chungbuk National University, Cheongju 28644, Republic of Korea
[3] Sternberg Astronomical Institute, Moscow State University, Universitetskii pr. 13, 119992 Moscow, Russia
[4] Instituto de Astrofisica de Canarias (IAC), E-38205 La Laguna, Tenerife, Spain
[5] Universidad de La Laguna, Dpto. Astrofísica, E-38206 La Laguna, Tenerife, Spain
[6] Institute of Astronomy, University of Cambridge, Madingley Road CB3 0HA, Cambridge, UK
[7] INAF - Osservatorio Astronomico di Roma, Via di Frascati 33, 00078 Monte Porzio Catone (Roma), Italy
[8] Indian Institute of Astrophysics, II Block Koramangala, Bengaluru 560034, India
[9] National Astronomical Research Institute of Thailand, 260, Moo 4, T. Donkaew, A. Mae Rim, Chiang Mai, 50180, Thailand
[10] Department of Space Sciences and Technologies, Faculty of Science, Akdeniz University, 07058, Antalya, Turkiye
[11] Université Côte d'Azur, Observatoire de la Côte d'Azur, CNRS, Laboratoire Lagrange, France
[12] School of Physics and Astronomy, Tel-Aviv University, tel-aviv 6997801, Israel
[13] Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109, USA
[14] NASA Postdoctoral Program Fellow
[15] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA
[16] Institute of Astronomy and NAO Rozhen, BAS, 72 Tsarighradsko Shousse Blvd., 1784 Sofia, Bulgaria
[17] National Optical Astronomy Observatory 950 N Cherry Avenue, Tucson, AZ 85719, USA
[18] Subaru Telescope, National Astronomical Observatory of Japan, 650 N Aohoku Place, Hilo, HI 96720, USA
[19] IAASARS, National Observatory of Athens, Vas. Pavlou & I. Metaxa, 15236 Penteli, Greece
[20] Dipartimento di Fisica E.R. Caianiello, Università di Salerno, Via Giovanni Paolo II 132, I-84084 Fisciano (SA), Italy
[21] Department of Astronomy and Space Sciences, Ege University, 35100 Izmir, Turkey
[22] Centre for Advanced Instrumentation, University of Durham, South Road, Durham DH1 3LE, United Kingdom
[23] Institut del Ciències del Cosmos (ICC), Universitat de Barcelona (IEEC-UB), c/ Martí i Franquès, 1, 08028 Barcelona, Spain
[24] Department of Astrophysics/IMAPP, Radboud University Nijmegen, P.O. Box 9010, 6500 GL Nijmegen, The Netherlands
[25] INAF - Osservatorio di Astrofisica e Scienza dello Spazio di Bologna, via Gobetti 93/3 - 40129 Bologna - Italy

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Astronomy & Astrophysics manuscript no. pap16aye
October 30, 2019

Full orbital solution for the binary system in the northern Galactic disc microlensing event Gaia16aye⋆

Łukasz Wyrzykowski[1,⋆⋆], P. Mróz[1], K. A. Rybicki[1], M. Gromadzki[1], Z. Kołaczkowski[45,79,⋆⋆⋆], M. Zieliński[1], P. Zieliński[1], N. Britavskiy[4,5], A. Gomboc[35], K. Sokolovsky[19,3,66], S.T. Hodgkin[6], L. Abe[89], G.F. Aldi[20,80], A. AlMannaei[62,100], G. Altavilla[72,7], A. Al Qasim[62,100], G.C. Anupama[8], S. Awiphan[9], E. Bachelet[63], V. Bakış[10], S. Baker[100], S. Bartlett[50], P. Bendjoya[11], K. Benson[100], I.F. Bikmaev[76,87], G. Birenbaum[12], N. Blagorodnova[24], S. Blanco-Cuaresma[15,74], S. Boeva[16], A.Z. Bonanos[19], V. Bozza[20,80], D.M. Bramich[62], I. Bruni[25], R.A. Burenin[84,85], U. Burgaz[21], T. Butterley[22], H. E. Caines[34], D. B. Caton[93], S. Calchi Novati[83], J.M. Carrasco[23], A. Cassan[29], V. Čepas[56], M. Cropper[100], M. Chruślińska[1,24], G. Clementini[25], A. Clerici[35], D. Conti[91], M. Conti[48], S. Cross[63], F. Cusano[25], G. Damljanovic[26], A. Dapergolas[19], G. D'Ago[81], J. H. J. de Bruijne[27], M. Dennefeld[29], V. S. Dhillon[30,4], M. Dominik[31], J. Dziedzic[1], O. Erece[32], M. V. Eselevich[86], H. Esenoglu[33], L. Eyer[74], R. Figuera Jaimes[31,53], S. J. Fossey[34], A. I. Galeev[76,87], S. A. Grebenev[84], A. C. Gupta[99], A. G. Gutaev[76], N. Hallakoun[12], A. Hamanowicz[1,36], C. Han[2], B. Handzlik[37], J. B. Haislip[94], L. Hanlon[102], L. K. Hardy[30], D. L. Harrison[6,88], H.J. van Heerden[103], V. L. Hoette[95], K. Horne[31], R. Hudec[39,76,40], M. Hundertmark[41], N. Ihanec[35], E. N. Irtuganov[76,87], R. Itoh[43], P. Iwanek[1], M.D.Jovanovic[26], R. Janulis[56], M. Jelínek[39], E. Jensen[92], Z. Kaczmarek[1], D. Katz[101], I.M. Khamitov[44,76], Y.Kilic[32], J. Klencki[1,24], U. Kolb[47], G. Kopacki[45], V. V. Kouprianov[94], K. Kruszyńska[1], S. Kurowski[37], G. Latev[16], C-H. Lee[17,18], S. Leonini[48], G. Leto[49], F. Lewis[50,59], Z. Li[63], A. Liakos[19], S. P. Littlefair[30], J. Lu[51], C.J. Manser[52], S. Mao[53], D. Maoz[12], A.Martin-Carrillo[102], J. P. Marais[103], M. Maskoliūnas[56], J. R. Maund[30], P. J. Meintjes[103], S. S. Melnikov[76,87], K. Ment[41], P. Mikołajczyk[45], M. Morrell[47], N. Mowlavi[74], D. Moździerski[45], D. Murphy[102], S. Nazarov[90], H. Netzel[1,79], R. Nesci[67], C.-C. Ngeow[54], A. J. Norton[47], E. O. Ofek[55], E. Pakštienė[56], L. Palaversa[6,74], A. Pandey[99], E. Paraskeva[19,78], M. Pawlak[1,65], M. T. Penny[57], B. E. Penprase[58], A. Piascik[59], J. L. Prieto[96,97], J. K. T. Qvam[98], C. Ranc[70], A. Rebassa-Mansergas[60,71], D. E. Reichart[94], P. Reig[61,75], L. Rhodes[30], J.-P. Rivet[89], G. Rixon[6], D. Roberts[47], P. Rosi[48], D.M. Russell[62], R. Zanmar Sanchez[49], G. Scarpetta[20,82], G. Seabroke[100], B. J. Shappee[69], R. Schmidt[41], Y. Shvartzvald[13,14], M. Sitek[1], J. Skowron[1], M. Śniegowska[1,77,79], C. Snodgrass[46], P. S. Soares[34], B. van Soelen[103], Z. T. Spetsieri[19,78], A. Stankevičiūtė[1], I. A. Steele[59], R. A. Street[63], J. Strobl[39], E. Strubble[95], H. Szegedi[103], L. M. Tinjaca Ramirez[48], L. Tomasella[64], Y. Tsapras[41], D. Vernet[11], S. Villanueva Jr.[57], O. Vince[26], J. Wambsganss[41,42], I. P. van der Westhuizen[103], K. Wiersema[52,68], D. Wium[103], R. W. Wilson[22], A. Yoldas[6], R.Ya. Zhuchkov[76,87], D. G. Zhukov[76], J. Zdanavičius[56], S. Zoła[37,38], and A. Zubareva[73,3]

(Affiliations can be found after the references)

[1] Warsaw University Astronomical Observatory, Al. Ujazdowskie 4, 00-478 Warszawa, Poland
[2] Department of Physics, Chungbuk National University, Cheongju 28644, Republic of Korea
[3] Sternberg Astronomical Institute, Moscow State University, Universitetskii pr. 13, 119992 Moscow, Russia
[4] Instituto de Astrofisica de Canarias (IAC), E-38205 La Laguna, Tenerife, Spain
[5] Universidad de La Laguna, Dpto. Astrofísica, E-38206 La Laguna, Tenerife, Spain
[6] Institute of Astronomy, University of Cambridge, Madingley Road CB3 0HA, Cambridge, UK
[7] INAF - Osservatorio Astronomico di Roma, Via di Frascati 33, 00078 Monte Porzio Catone (Roma), Italy
[8] Indian Institute of Astrophysics, II Block Koramangala, Bengaluru 560034, India
[9] National Astronomical Research Institute of Thailand, 260, Moo 4, T. Donkaew, A. Mae Rim, Chiang Mai, 50180, Thailand
[10] Department of Space Sciences and Technologies, Faculty of Science, Akdeniz University, 07058, Antalya, Turkiye
[11] Université Côte d'Azur, Observatoire de la Côte d'Azur, CNRS, Laboratoire Lagrange, France
[12] School of Physics and Astronomy, Tel-Aviv University, tel-aviv 6997801, Israel
[13] Jet Propulsion Laboratory, California Institute of Technology, 4800 Oak Grove Drive, Pasadena, CA 91109, USA
[14] NASA Postdoctoral Program Fellow
[15] Harvard-Smithsonian Center for Astrophysics, 60 Garden Street, Cambridge, MA 02138, USA
[16] Institute of Astronomy and NAO Rozhen, BAS, 72 Tsarighradsko Shousse Blvd., 1784 Sofia, Bulgaria
[17] National Optical Astronomy Observatory 950 N Cherry Avenue, Tucson, AZ 85719, USA
[18] Subaru Telescope, National Astronomical Observatory of Japan, 650 N Aohoku Place, Hilo, HI 96720, USA
[19] IAASARS, National Observatory of Athens, Vas. Pavlou & I. Metaxa, 15236 Penteli, Greece
[20] Dipartimento di Fisica E.R. Caianiello, Università di Salerno, Via Giovanni Paolo II 132, I-84084 Fisciano (SA), Italy
[21] Department of Astronomy and Space Sciences, Ege University, 35100 Izmir, Turkey
[22] Centre for Advanced Instrumentation, University of Durham, South Road, Durham DH1 3LE, United Kingdom
[23] Institut del Ciències del Cosmos (ICC), Universitat de Barcelona (IEEC-UB), c/ Martí i Franquès, 1, 08028 Barcelona, Spain
[24] Department of Astrophysics/IMAPP, Radboud University Nijmegen, P.O. Box 9010, 6500 GL Nijmegen, The Netherlands
[25] INAF - Osservatorio di Astrofisica e Scienza dello Spazio di Bologna, via Gobetti 93/3 - 40129 Bologna - Italy

Your affiliation as you want it to appear correctly in potential publications

Address

Al. Ujazdowskie 4, 00-478 Warszawa, Poland

About me

my ORCID: 0000-0002-9658-6151, interested in microlensing, black holes, time-domain astronomy networks, machine learning

Register

every registration needs approval by a human
who will read the About me field
Wait for a confirmation email before continuing

BHTOM2

registration

Latex Name*

{\L}.~Wyrzykowski

Your name as you want it to appear correctly in potential publications

Affiliation*

Astronomical Observatory, University of Warsaw, Poland

Your affiliation as you want it to appear correctly in potential publications

Address

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About me*

managing BHTOM

ORCID ID, more details

0000-0002-9658-6151

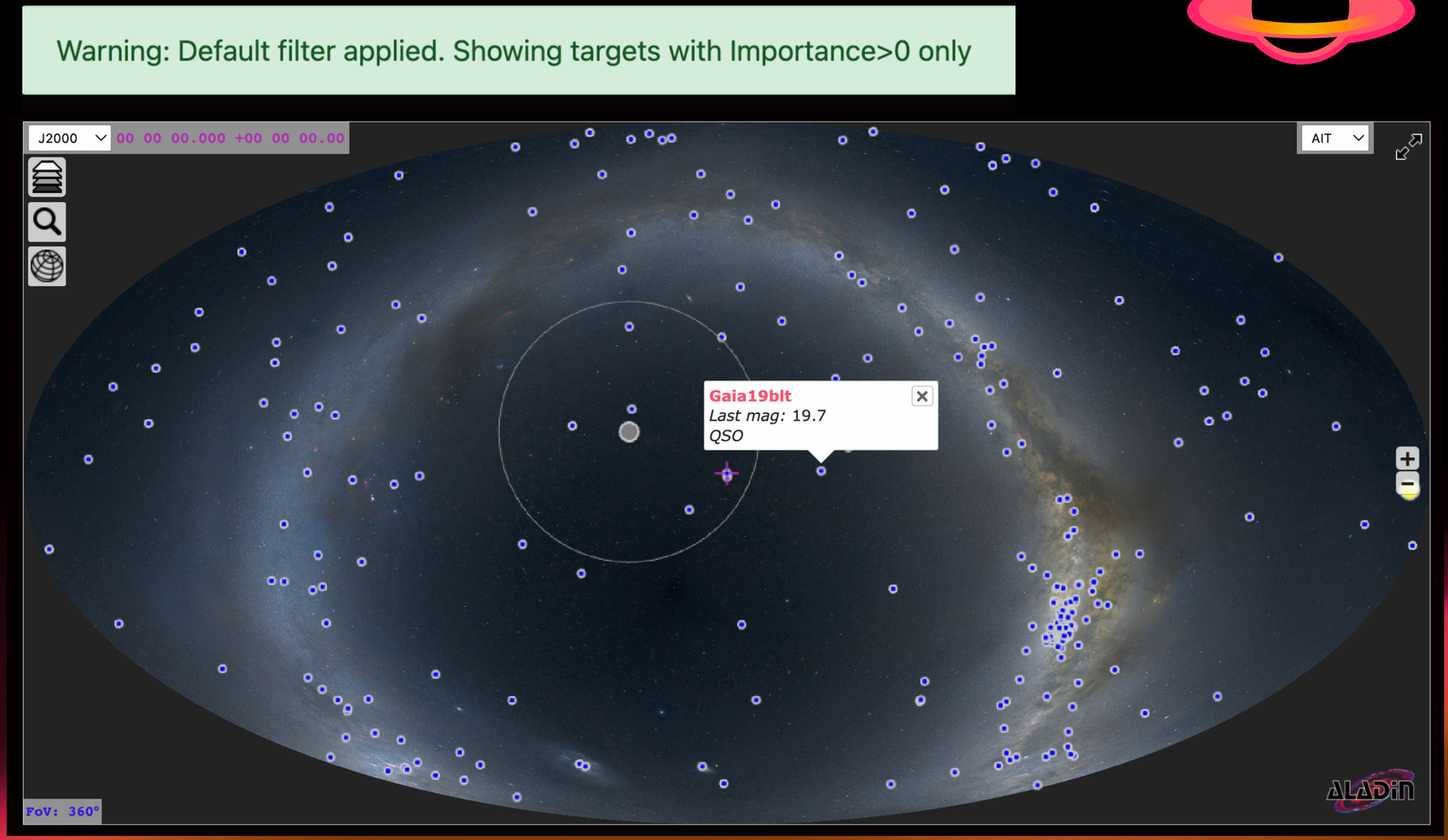
Update

ACTION:
Login to BHTOM
Click on your user name
Correct*:
- LaTeX name
- Affiliation
- Institutional Address (also LaTeX)
- ORCID

* you might miss a publication opportunity if these details are not provided!

target lists

- Aladin map
- default: Mellinger
- equatorial-galactic
- interactive
- Moon
- Sun
- other wavelengths
- grid



BHTOM2

target lists

- Aladin map
- default: Mellinger
- equatorial-galactic
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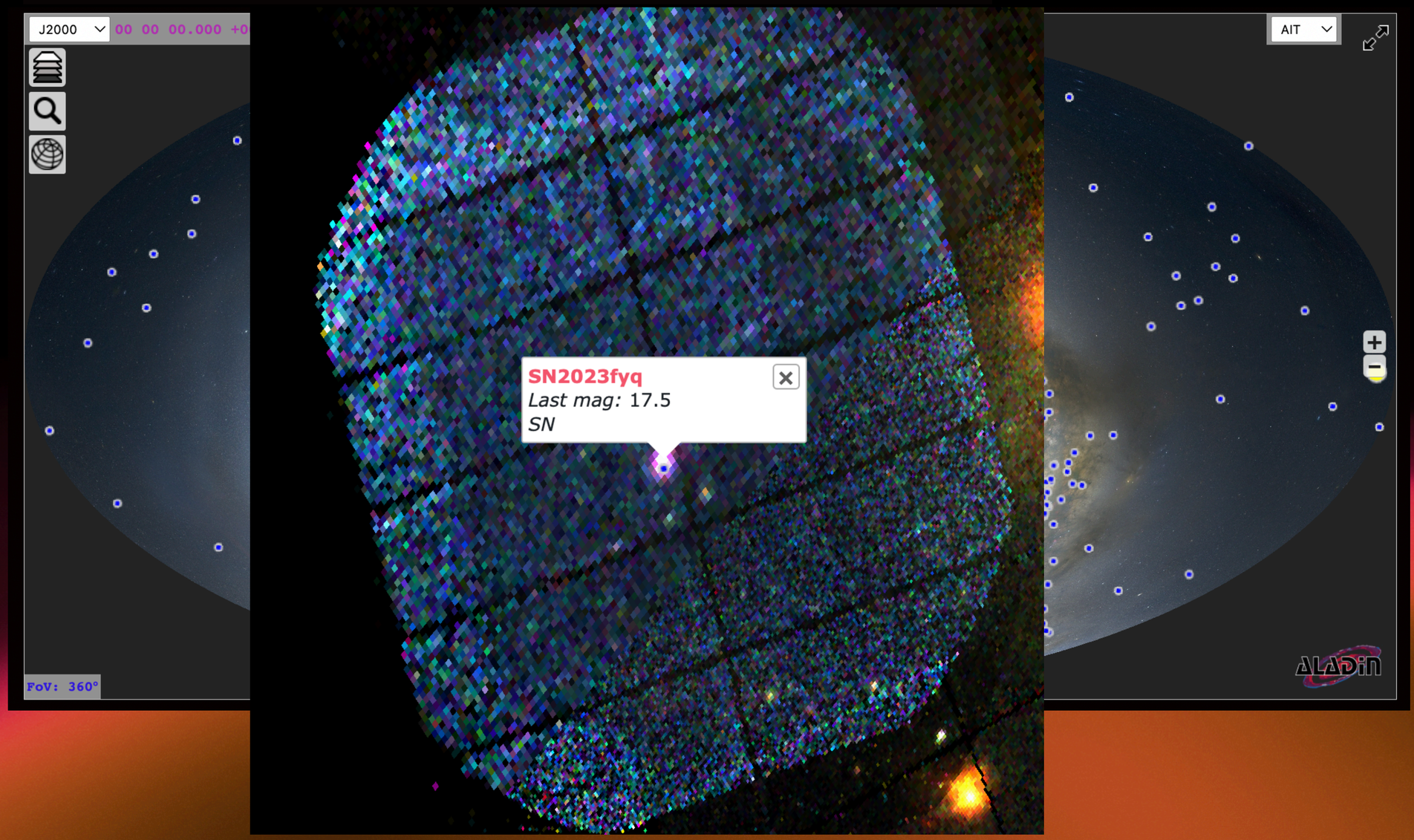
- other wavelengths
- grid



BHTOM2

target lists

Add/Remove from grouping [ ] Add Move Remove

Show 10 entries

	Names	RA	Dec	Nobs	Last Gmag	Last Filter	Importance	Created	Priority	Sun	Class
☐	Gaia22bpl	10:38:42.425	-61:15:49.680	903	12.7	Gaia/r	9.99	2023-10-01 06:10:13	336.7	62	Microlensing Event
☐	Gaia23cpd	19:10:08.822	-04:43:14.736	1810	15.1	Gaia/r	9.99	2023-10-01 18:10:29	91.6	100	Unknown
☐	Gaia23bay	19:49:42.996	+10:43:41.448	1953	13.8	Gaia/r	9.99	2023-10-01 19:10:47	46.8	110	Unknown
☐	Gaia22bra	19:50:00.876	+26:29:07.908	2150	15.7	Gaia/r	9.99	2023-10-01 17:10:22	23.6	109	Unknown
☐	Gaia23cnu	18:56:25.440	-18:04:50.880	1364	15.4	Gaia/r	9.99	2023-10-01 18:10:28	121.6	95	Unknown
☐	Gaia21fkl	07:46:28.378	-21:52:32.016	1380	15.8	Gaia/r	9.99	2023-10-01 08:10:18	32.6	71	Unknown
☐	Gaia22dkv	10:07:04.555	-66:10:51.204	1304	13.2	Gaia/r	9.99	2023-10-01 09:10:52	335.3	68	Unknown
☐	Gaia23cnw	18:29:59.232	-14:02:27.564	265	17.7	Gaia/r	9.99	2023-10-01 18:10:28	126.6	89	Unknown
☐	Gaia23cqh	19:08:36.578	+11:08:30.552	1406	17.0	Gaia/r	9.99	2023-10-01 18:10:29	66.5	100	Unknown

Showing 1 to 9 of 9 entries

Previous 1 Next

BHTOM2

target lists

target groupings

Add/Remove from grouping [ ] Add Move Remove

Show 10 entries

sortable columns

	Names	RA	Dec	Nobs	Last Gmag	Last Filter	Importance	Created	Priority	Sun	Class
☐	Gaia22bpl	10:38:42.425	-61:15:49.680	903	12.7	Gaia/r	9.99				Microlensing Event
☐	Gaia23cpd	19:10:08.822	-04:43:14.736	1810	15.1	Gaia/r	9.99	2023-10-01 18:10:29	91.6	100	Unknown
☐	Gaia23bay	19:49:42.996	+10:43:41.448	1953	13.8	Gaia/r	9.99	2023-10-01 19:10:47	46.8	110	Unknown
☐	Gaia22bra	19:50:00.876	+26:29:07.908	2150	15.7	Gaia/r	9.99	2023-10-01 17:10:22	23.6	109	Unknown
☐	Gaia23cnu	18:56:25.440	-18:04:50.880	1364	15.4	Gaia/r	9.99	2023-10-01 18:10:28	121.6	95	Unknown
☐	Gaia21fkl	07:46:28.378	-21:52:32.016	1380	15.8	Gaia/r	9.99	2023-10-01 08:10:18	32.6	71	Unknown
☐	Gaia22dky	10:07:04.555	-66:10:51.204	804	13.2	Gaia/r	9.99	2023-10-01 09:10:52	335.3	68	Unknown
☐					17.7	Gaia/r	9.99	2023-10-01 18:10:28	126.6	89	Unknown
☐	Gaia23cqn	19:08:36.578	+11:08:30.552	06	17.0	Gaia/r	9.99	2023-10-01 18:10:29	66.5	100	Unknown

class as enum

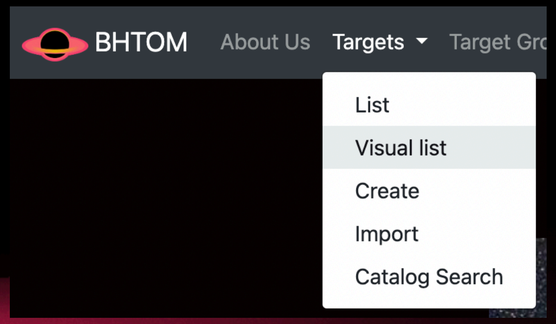
last magnitude calibrated roughly to Gaia even if no Gaia G available (uses all but WISE bands)

Showing 1 to 9 of 9 entries

Previous 1 Next

BHTOM2

target visual list



define your filter first

Name

Name

Key

Key

Value

Value

Cone Search

Cone Search

RA, Dec, Search Radius (degrees)

Target Grouping

Cone Search (Target)

Cone Search (Target)

Target Name, Search Radius (degrees)

RA

min RA

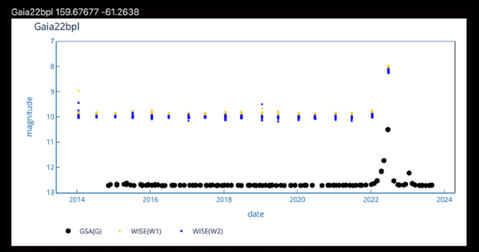
max RA

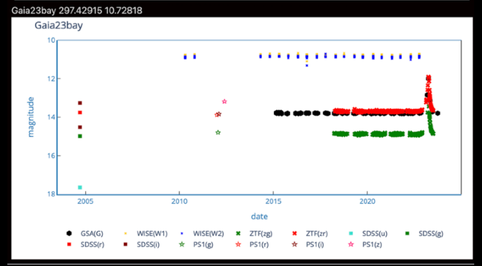
Dec

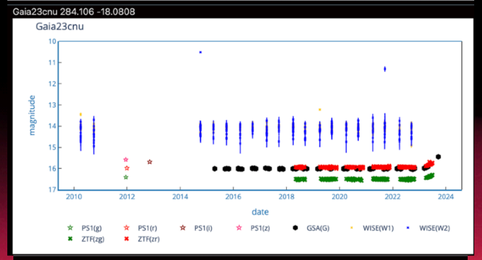
min Dec

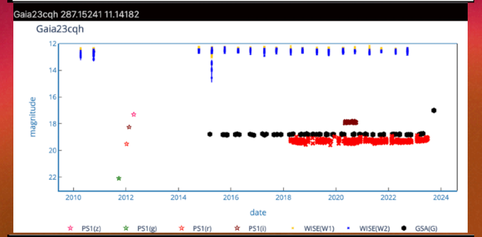
max Dec

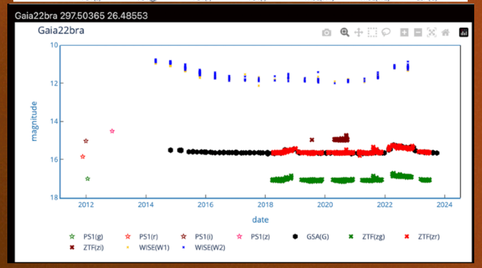
Filter Reset











interactive plots
click links to detail

BHTOM2

target lists - filtering example

RA (0,360)

min	RA (0,360)
max	RA (0,360)

Dec (-90,90)

min	0
max	Dec (-90,90)

North only

Importance (0,10)

min	4
max	Importance (0,10)

Importance>4

Sun separation (0,360)

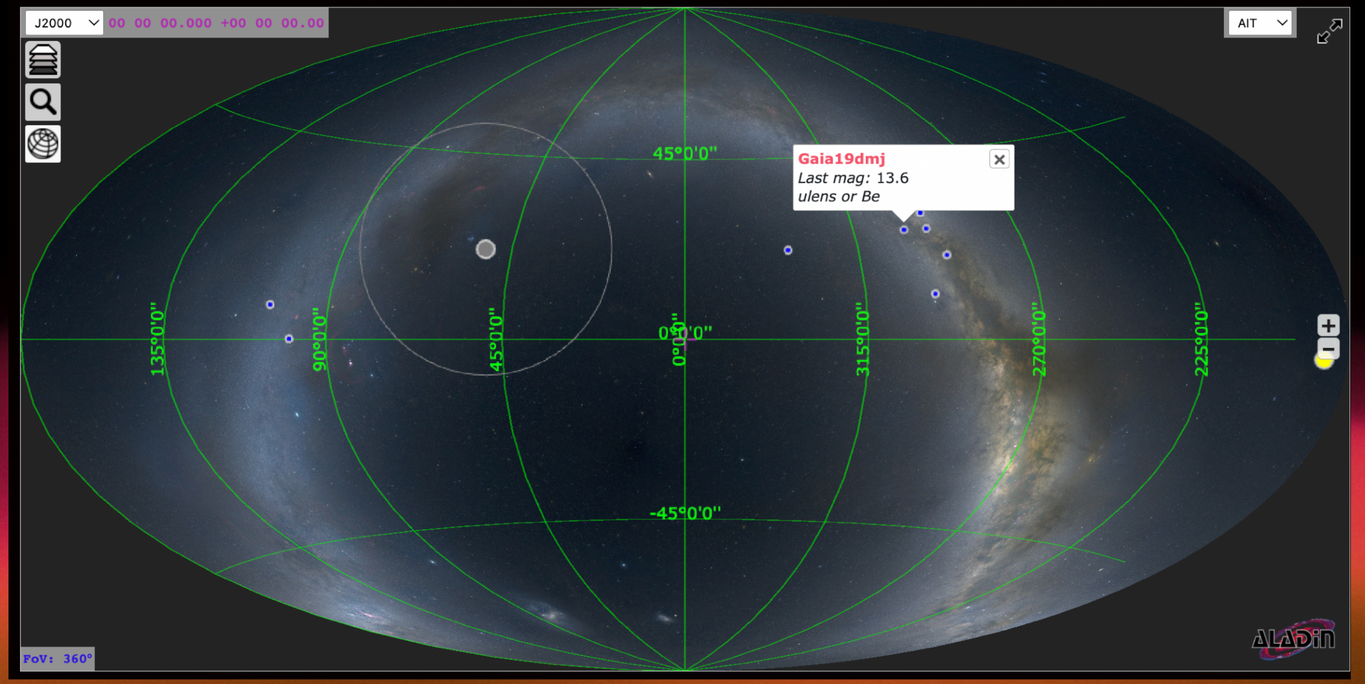
min	60
max	Sun separation (0,360)

visible now

Last G magnitude

min	Last G magnitude
max	18

not fainter than 18 mag



BHTOM2

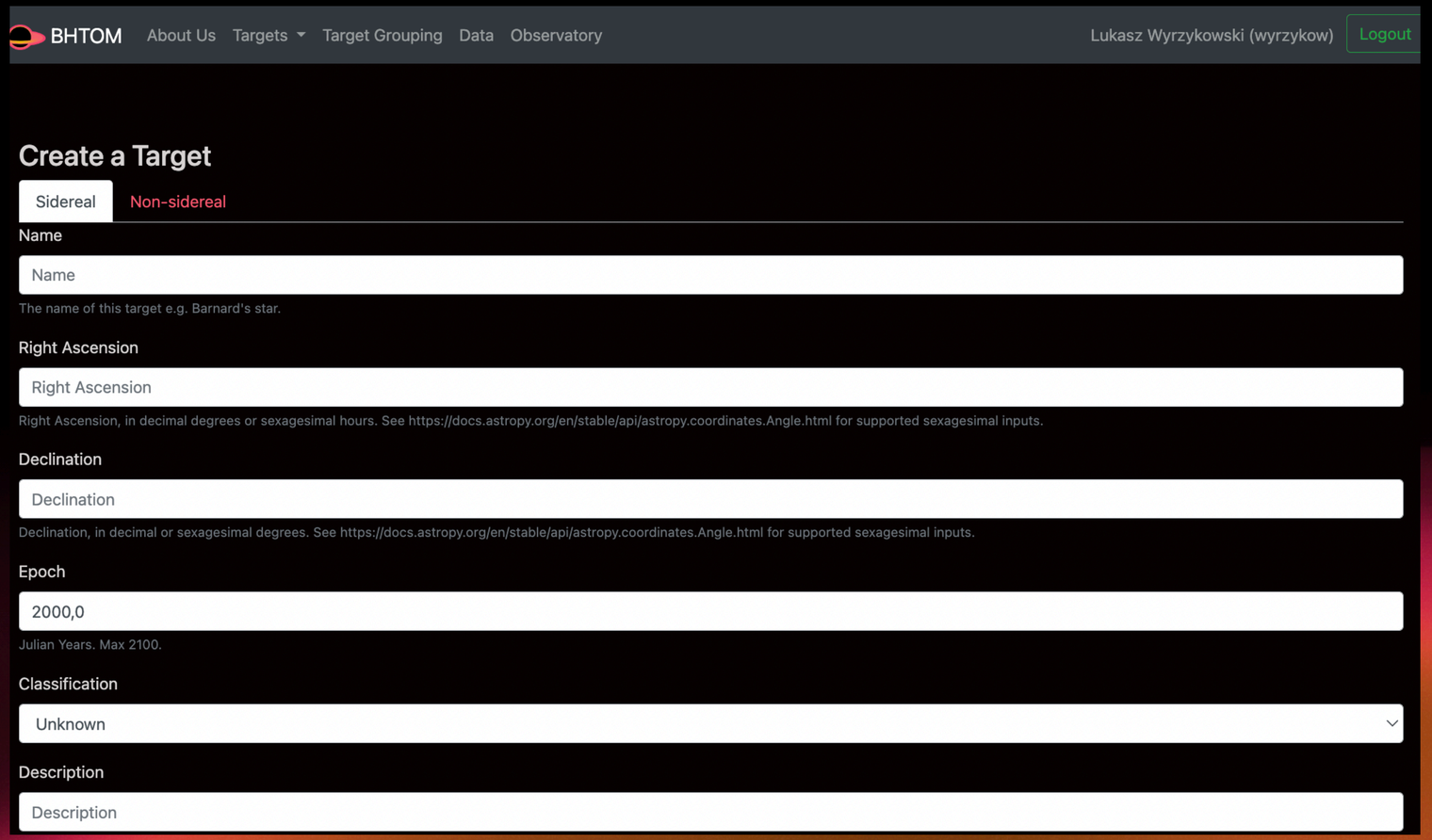
target create

- Create manually
- Import
- Catalog search

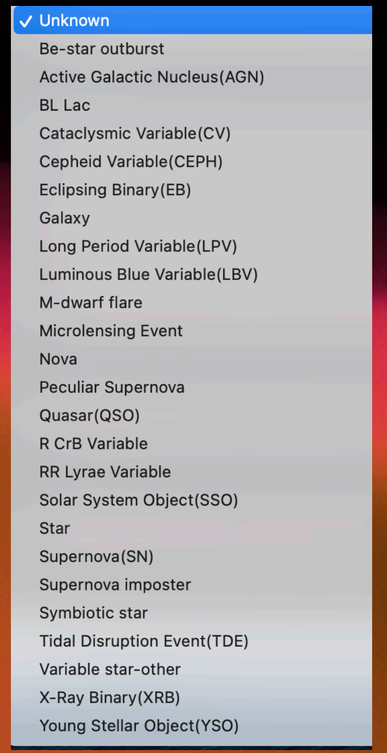
BHTOM2

target create

- Create manually
- Import
- Catalog search



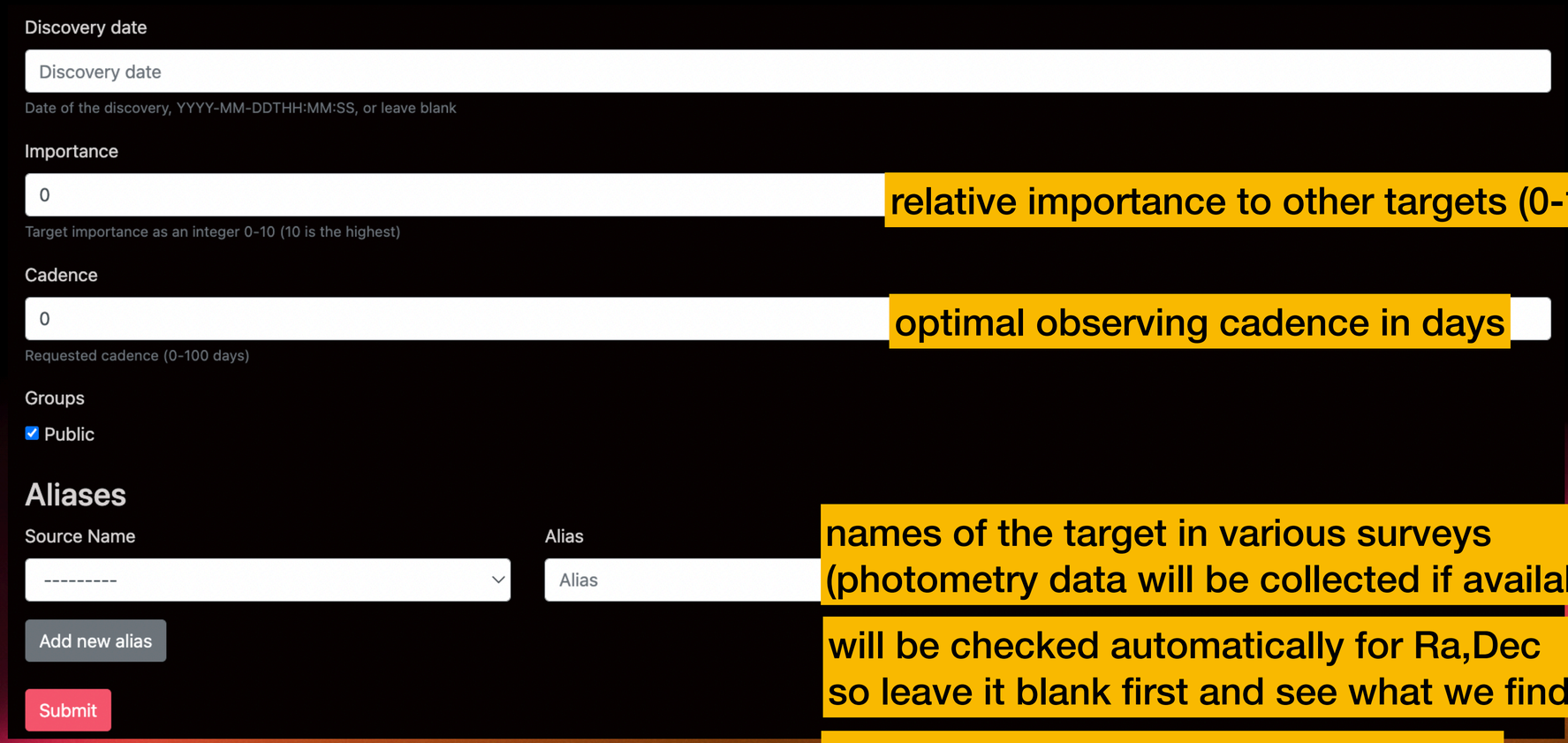
classification types

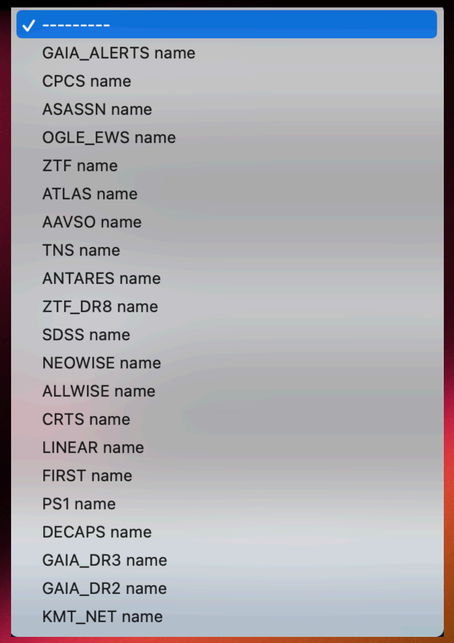


BHTOM2

target create

- Create manually
- Import
- Catalog search





target create — import

- powerful tool!
- use with caution!
- important:
  correct headers
  in CSV files
  (case sensitive!)
- special case for
  Gaia Alerts

Import Targets

Upload a .csv to import targets in bulk.

Allowed field names:

```
name, ra, dec, epoch, parallax, pm_ra, pm_dec, distance, distance_err,
classification, discovery_date, importance, cadence, phot_class,
scheme, epoch_of_elements, mean_anomaly, arg_of_perihelion, eccentricity,
lng_asc_node, inclination, mean_daily_motion, semimajor_axis, epoch_of_perihelion,
ephemeris_period, ephemeris_period_err, ephemeris_epoch, ephemeris_epoch_err, perihdist
```

CSV file format examples:

```
name, type, ra, dec, redshift, distance, classification
mytarget, SIDERAL, 123.12, -12.34, 2.35, 1.0
```

```
name, ra, dec
mytarget, 123.12, -12.34
```

```
name, GAIA_ALERTS_name
mytarget, Gaia20dup

name, GAIA_ALERTS_name, cadence
mytarget, Gaia20dup, 3
```

In these special cases, the Gaia Alerts harvester will gather all information from Gaia Alerts, but any extra columns in the CSV file with corresponding fields will replace those read from Gaia Alerts.

Choose file No file chosen

Upload

BHTOM2

target create — catalog search

Search Catalogs for a Target

Term

Gaia19axp

Service

- ✓ Gaia Alerts
- TNS
- ANTARES
- Simbad
- NED
- JPL Horizons

Search Catalogs for a Target

Term

SN2023ixf

Service

TNS

search

Create a Target

Sidereal | Non-sidereal

Name

Gaia19axp

The name of this target e.g. Barnard's star.

Right Ascension

216.94333

Right Ascension, in decimal degrees or sexagesimal hours. See https://docs.astropy.org/en/stable/api/astropy.coordinates.Angle.html for supported sexagesimal inputs.

pre-filled fields

Declination

29.51063

Declination, in decimal or sexagesimal degrees. See https://docs.astropy.org/en/stable/api/astropy.coordinates.Angle.html for supported sexagesimal inputs.

pre-filled fields

Epoch

2000

Julian Years. Max 2100.

Classification

Quasar(QSO)

pre-filled fields

Description

QSO with little prior variability in Gaia brightens by 1 mag. SDSS spectrum.

pre-filled fields

Discovery date

2019-03-10 14:27:41

Date of the discovery, YYYY-MM-DDTHH:MM:SS, or leave blank

pre-filled fields

Importance

9,99

Target importance as an integer 0-10 (10 is the highest)

importance set to 9.99, but should be edited

Cadence

1,0

Requested cadence (0-100 days)

cadence set to 1, but should be edited

target create — under the hood

- *kafka request sent from BHTOM to cpcs and harvester services*
- *WSDB 0.5 deg radius data downloaded to cache (GaiaSP, 2MASS) for calibration*
- *harvesters run on Ra,Dec to check for possible other names, e.g. TNS, Gaia DR3*
- *brokers run on selected archives to grab all photometry available (e.g. Gaia DR3, SDSS, DECAPS, CRTS, LINEAR, ZTF)*
- *photometric classification on archives executed (Gezer+2022)*
- *constellation identified*
- *target observing priority computed based on the request and given the data*
- *Sun separation computed*
- *brokers with fresh photometric data will be searched for new data automatically later*

BHTOM2

target create

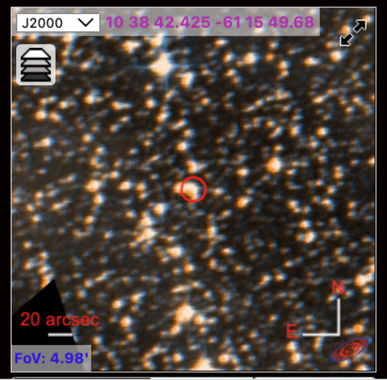
Target created, grabbing all the data for it. Please wait and refresh in about a minute... ×

Gaia22bpl

Update Target | Delete Target

Name	Gaia22bpl
Right Ascension	159.67677 10:38:42.425
Declination	-61.2638 -61:15:49.680
Epoch	2000.0
Discovered	2022-04-14 01:04:50
Class	Unknown
Target importance (0-10)	9.99
Cadence requested (d)	1.0

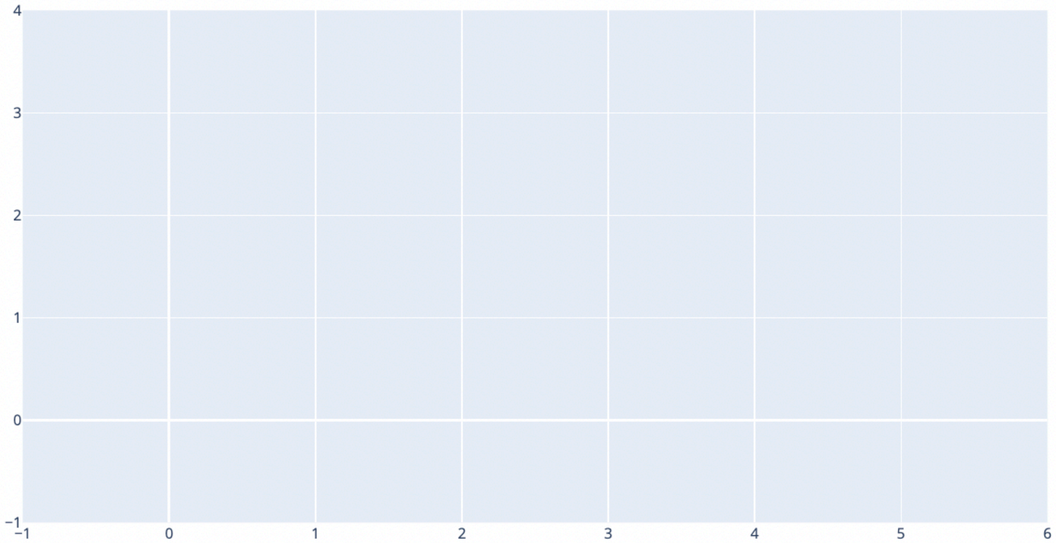
Other names:



Photometry | Models | Spectroscopy | Observe | Observations | Publication | Manage Data | Manage Groups

Photometry

Check for new data



Download photometry data | Download radio data

Recent Photometry

Timestamp	Magnitude	Filter	Facility

target create

DIRECT ACCESS via name: https://bh-tom2.astrolabs.pl/targets/Gaia22bpl/

BHTOM2

Gaia22bpl

Update Target | Delete Target

Name	Gaia22bpl
Right Ascension	159.67677 10:38:42.425
Declination	-61.2638 -61:15:49.680
Epoch	2000.0
Galactic Longitude	287.662164
Galactic Latitude	-2.390806
Constellation	Carina
Discovered	2022-04-14 01:04:50
Class	Microlensing Event
Phot.Class	Ulens Candidate 100.0%
Last MJD	60184.56631
Last G Mag	12.7
Target importance (0-10)	9.99
Cadence requested (d)	1.0
Observing priority	330.0
Sun Separation (deg)	62.0

Other names:

GAIA_ALERTS
Gaia22bpl

GAIA_DR3
5254100872645875968

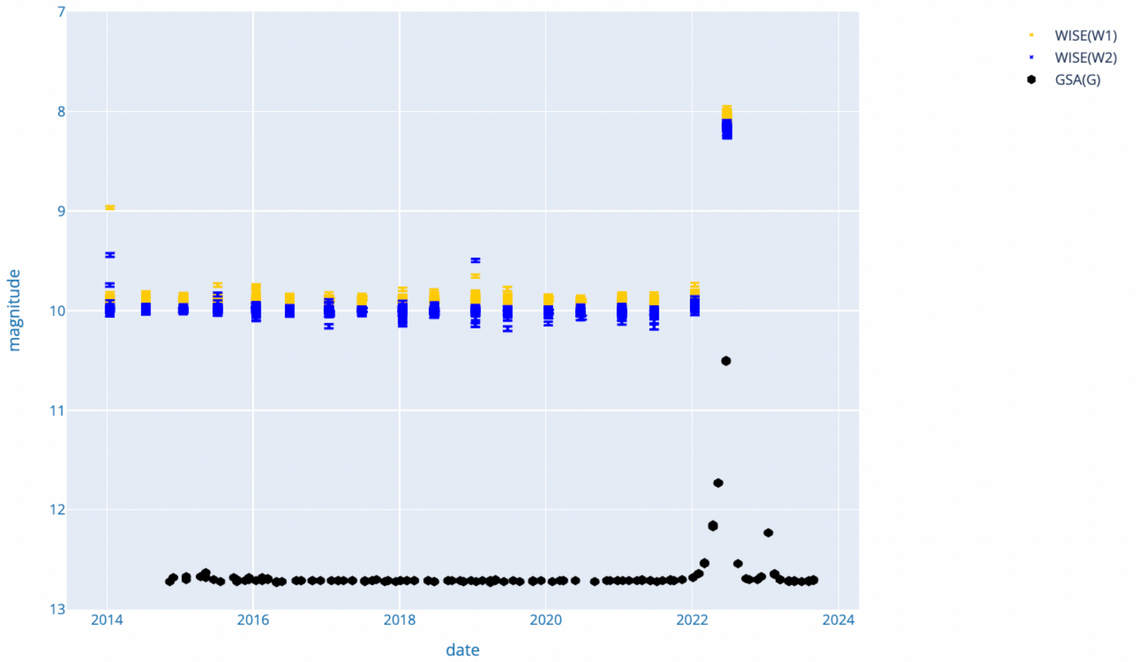
NEOWISE
NEOWISE+J159.67677_-61.2638

CRTS
CRTS+J159.67677_-61.2638

Photometry | Models | Spectroscopy | Observe | Observations | Publication | Manage Data | Manage Groups

Photometry

Check for new data



Download photometry data | Download radio data

Recent Photometry

Timestamp	Magnitude	Filter	Facility
2023-08-28 13:08:29	12.7100	GSA(G)	Gaia Alerts
2023-08-28 11:08:54	12.7000	GSA(G)	Gaia Alerts
2023-08-05 13:08:59	12.7200	GSA(G)	Gaia Alerts
2023-08-05 11:08:24	12.7100	GSA(G)	Gaia Alerts
2023-07-01 00:07:48	12.7200	GSA(G)	Gaia Alerts

BHTOM2

target detail

Gaia22bpl

Update Target | Delete Target

Name	Gaia22bpl
Right Ascension	159.67677 10:38:42.425
Declination	-61.2638 -61:15:49.680
Epoch	2000.0
Galactic Longitude	287.662164
Galactic Latitude	-2.390806
Constellation	Carina
Discovered	2022-04-14 01:04:50
Class	Microlensing Event
Phot.Class	Ulens Candidate 100.0%
Last MJD	60184.56631
Last G Mag	12.7
Target importance (0-10)	9.99
Cadence requested (d)	1.0
Observing priority	330.0
Sun Separation (deg)	62.0

Other names:

GAIA_ALERTS
Gaia22bpl

GAIA_DR3
5254100872645875968

NEOWISE
NEOWISE+J159.67677_-61.2638

CRTS
CRTS+J159.67677_-61.2638

constellation

automatic classification

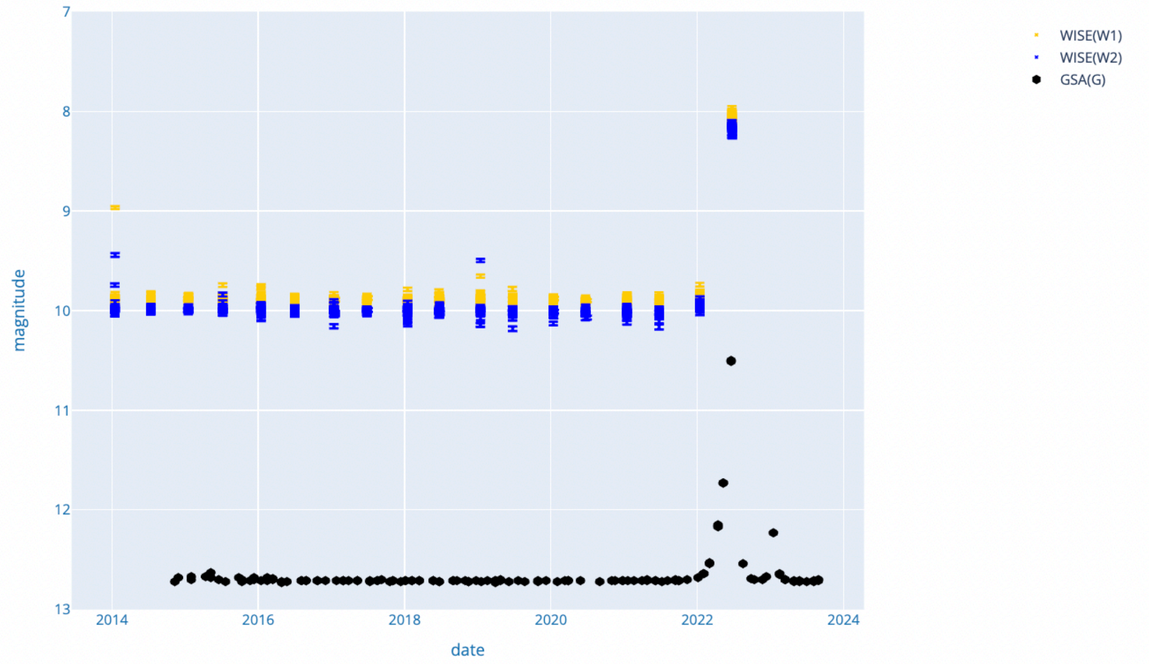
external links

external links

Photometry | Models | Spectroscopy | Observe | Observations | Publication | Manage Data | Manage Groups

Photometry

Check for new data



Download photometry data | Download radio data

Recent Photometry

Timestamp	Magnitude	Filter	Facility
2023-08-28 13:08:29	12.7100	GSA(G)	Gaia Alerts
2023-08-28 11:08:54	12.7000	GSA(G)	Gaia Alerts
2023-08-05 13:08:59	12.7200	GSA(G)	Gaia Alerts
2023-08-05 11:08:24	12.7100	GSA(G)	Gaia Alerts
2023-07-01 00:07:48	12.7200	GSA(G)	Gaia Alerts

BHTOM2

target detail

Gaia22bpl

Update Target | Delete Target

Name	Gaia22bpl
Right Ascension	159.67677 10:38:42.425
Declination	-61.2638 -61:15:49.680
Epoch	2000.0
Galactic Longitude	287.662164
Galactic Latitude	-2.390806
Constellation	Carina
Discovered	2022-04-14 01:04:50
Class	Microlensing Event
Phot.Class	Ulens Candidate 100.0%
Last MJD	60184.56631
Last G Mag	12.7
Target importance (0-10)	9.99
Cadence requested	1.0
Sun Separation (deg)	62.0

Other names:

GAIA_ALERTS
Gaia22bpl

GAIA_DR3
5254100872645875968

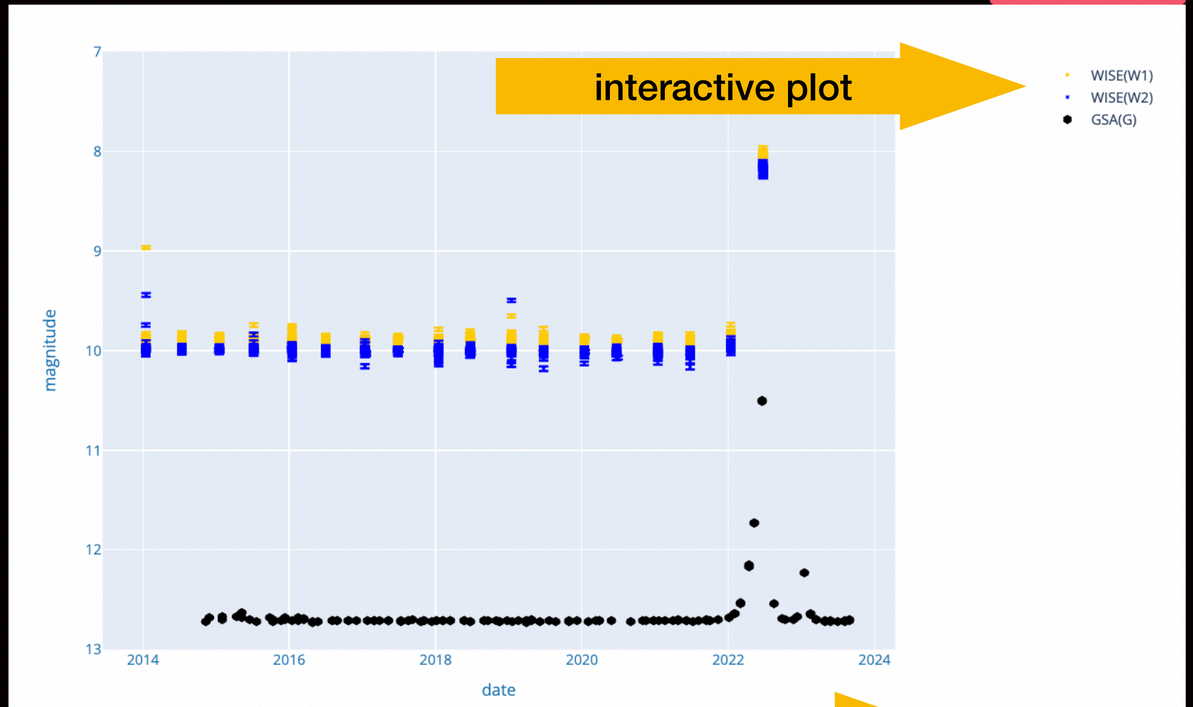
NEOWISE
NEOWISE+J159.67677_-61.2638

CRTS
CRTS+J159.67677_-61.2638

Photometry | Models | Spectroscopy | Observe | Observations | Publication | Manage Data | Manage Groups

Photometry

Check for new data



data download

Download photometry data

radio data download(if exists)

Download radio data

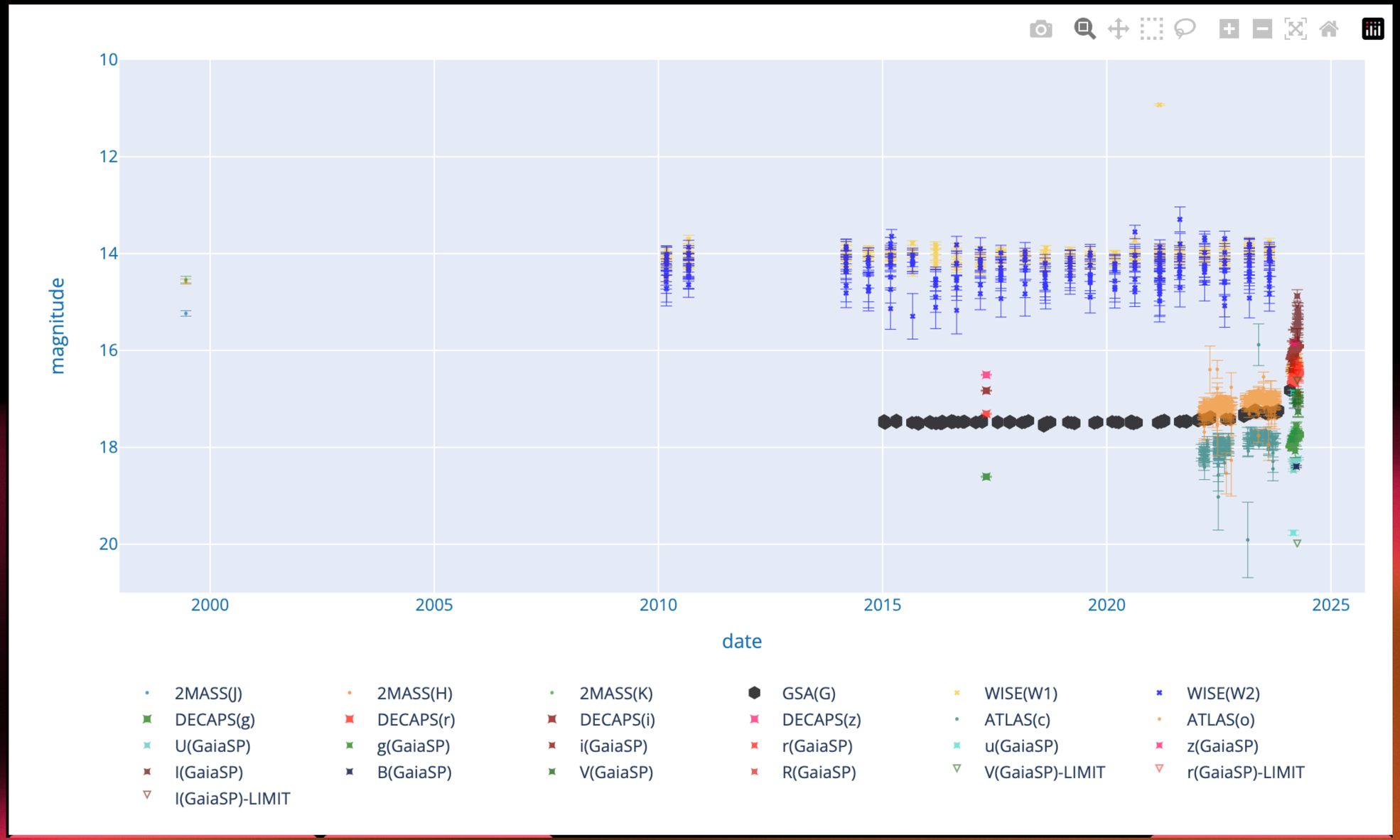
Recent Photometry

Timestamp	Magnitude	Filter	Facility
2023-08-28 13:08:29	12.7100	GSA(G)	Gaia Al…
2023-08-28 11:08:54	12.7000	GSA(G)	Gaia Alerts
2023-08-05 13:08:59	12.7200	GSA(G)	Gaia Alerts
2023-08-05 11:08:24	12.7100	GSA(G)	Gaia Alerts
2023-07-01 00:07:48	12.7200	GSA(G)	Gaia Alerts

most recent photometry

BHTOM2

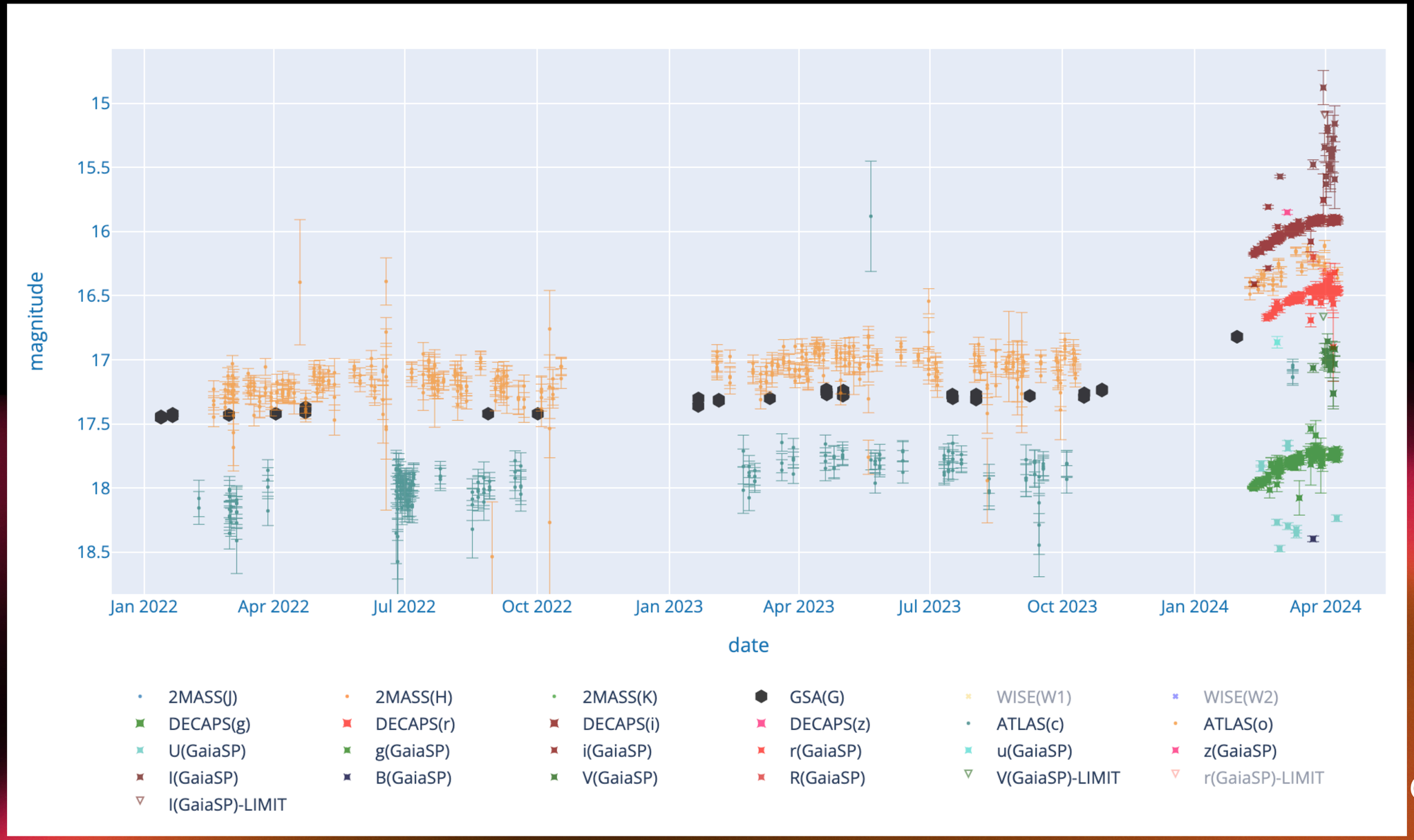
target light curve - per filter



Gaia24amo

BHTOM2

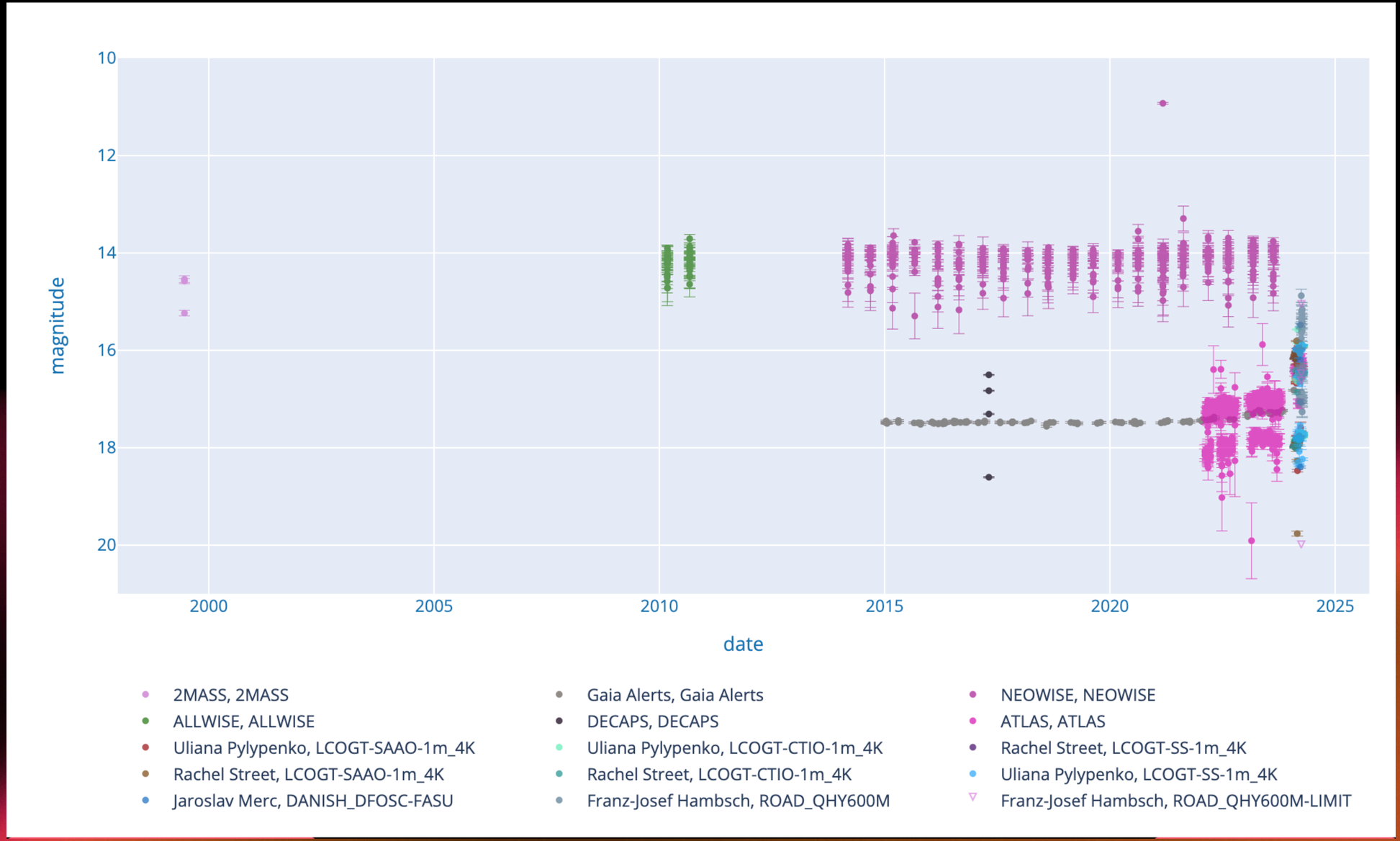
target light curve - per filter



Gaia24amo

BHTOM2

target light curve - per facility

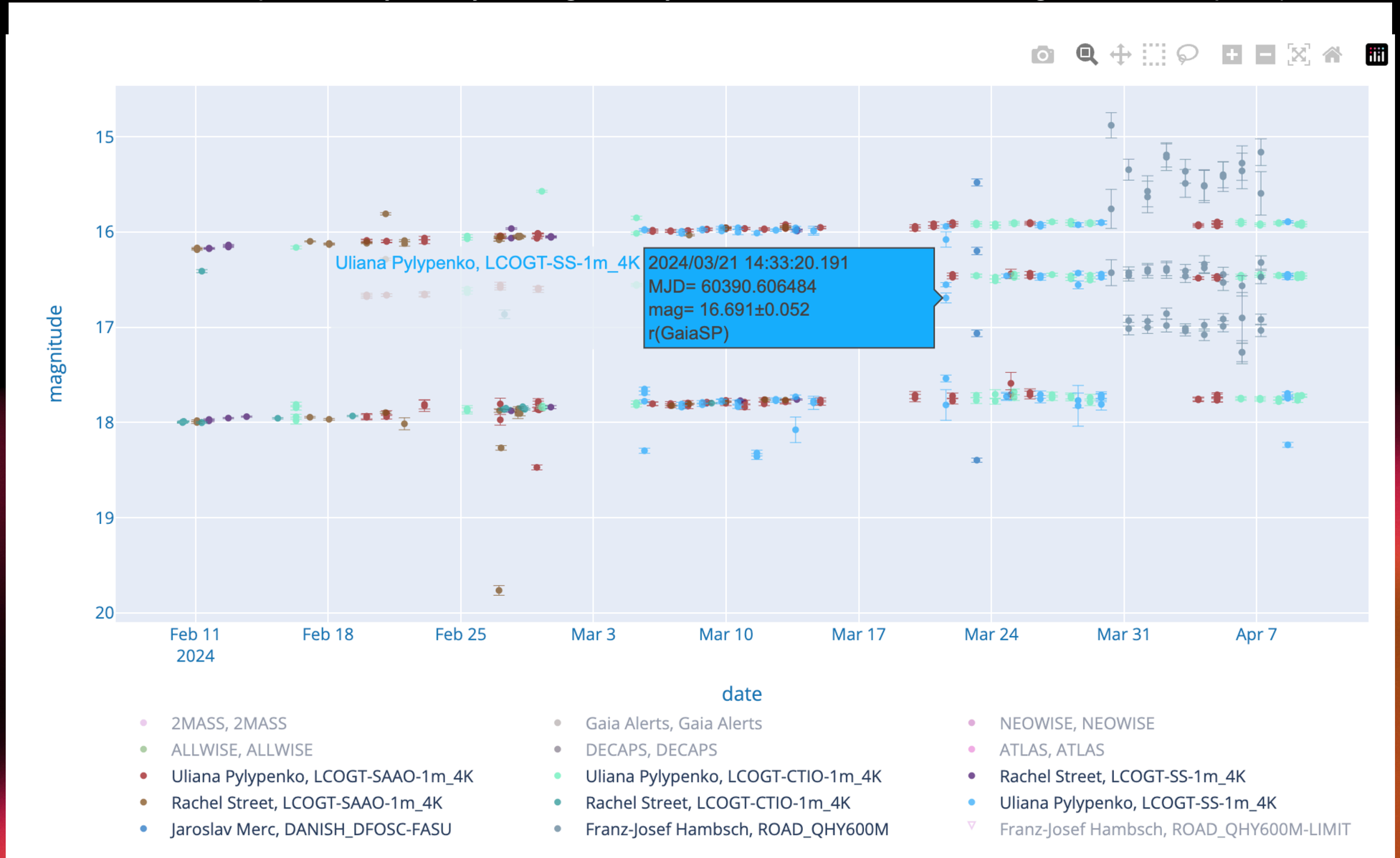


Gaia24amo

BHTOM2

target light curve - per facility

random colours per facility - they change everytime there is a need to re-generate the plot (new data)



Gaia24amo

BHTOM2

models

Gaia22bpl

Update Target | Delete Target

Name	Gaia22bpl
Right Ascension	159.67677
	10:38:42.425
Declination	-61.2638
	-61:15:49.680
Epoch	2000.0
Galactic Longitude	287.662164
Galactic Latitude	-2.390806
Constellation	Carina
Discovered	2022-04-14 01:04:50
Class	Microlensing Event
Phot.Class	Ulens Candidate 100.0%
Last MJD	60184.56631
Last G Mag	12.7
Target importance (0-10)	9.99
Cadence requested (d)	1.0
Observing priority	336.7
Sun Separation (deg)	62.0

Other names:

Photometry | Models | Sp... | ...ication | Manage Data | Manage Groups

models

Microlensing model standard — The simplest microlensing model, single lens, single source, no parallax

Microlensing model parallax — Microlensing model, single lens, single source, with parallax

your model can be added here!

Comments

No comments yet.

Comment

Comment

Post

models — separate interactive window

Microlensing model for Gaia22bpl

Gravitational microlensing model using MulensModel (Poleski&Yee 2018)

Fit initial values:

t0: 2459749.048410 u0: 0.129032 tE: 50.00000 logu0: ☐ fixblending: ☑
auto_init: ☐

parameter init

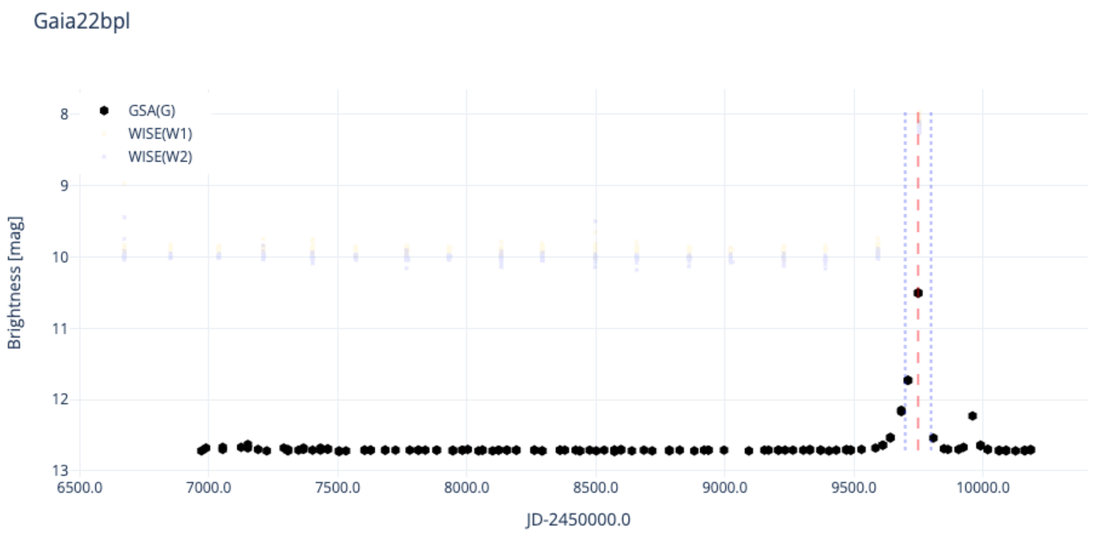
Available filters and number of datapoints:

Select All | Deselect All

☑ GSA(G) 129
☐ WISE(W1) 387
☐ WISE(W2) 387

interactive data selection

MODEL



models

ication Manage Data Manage Groups

microlensing model, single lens, single source, no parallax

Fitted parameters

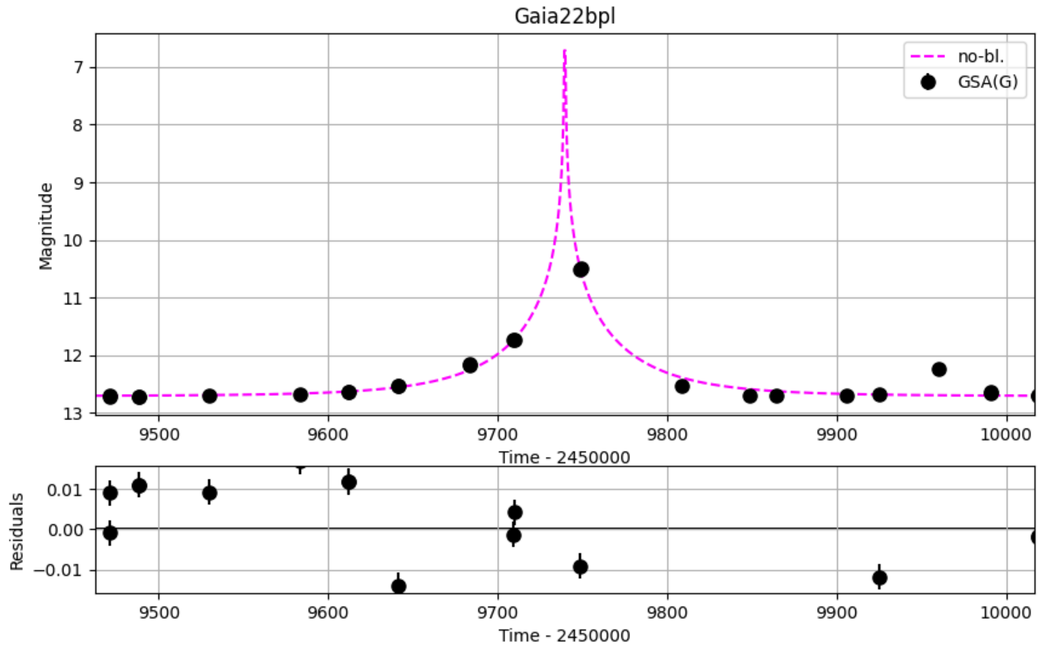
Best Fit: t_0 = 2459739.69022, u_0 = 0.00000, t_E = 69.268

Chi2 = 23120.64 Chi2/ndof = 183.50

model results

Filter	Mag0	FS
GSA(G)	12.708	1.0

Fitted light curve



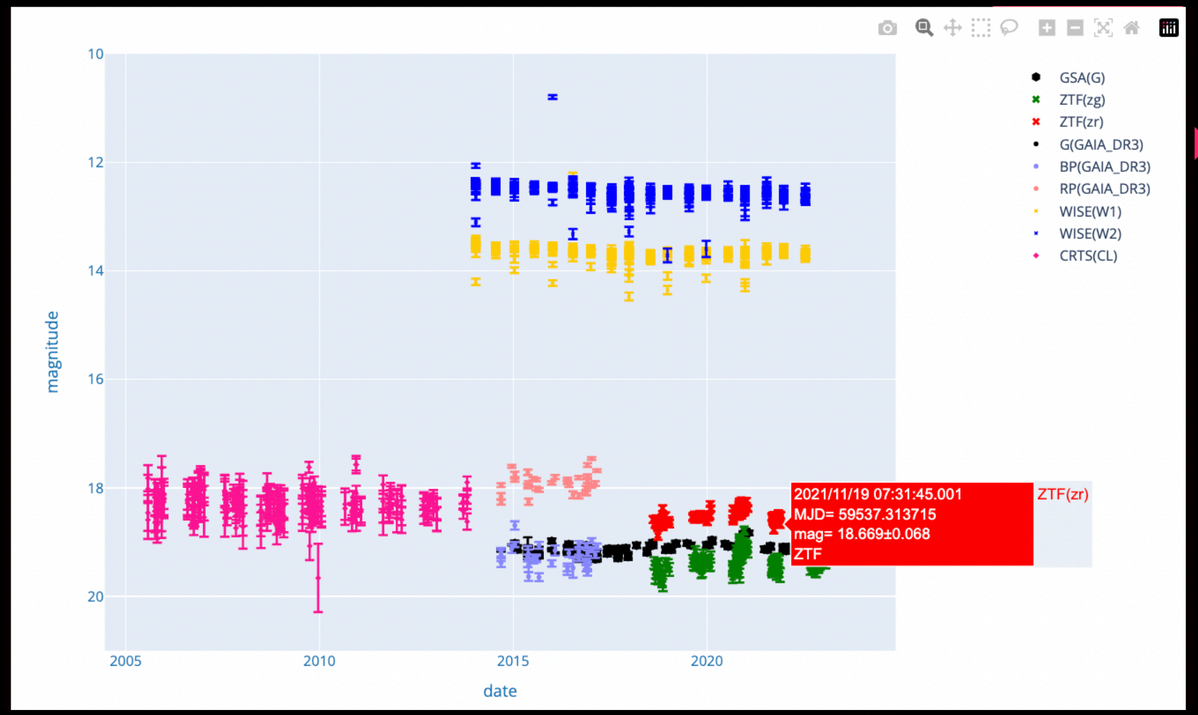
Time of fitting execution: 0.112 seconds

archives (via brokers)

- Gaia Science Alerts (2014+)
- Gaia DR3 variables (2014-2017)
- ZTF Data Release and alerts (2018+) through ANTARES and Alerce
- Catalina Real-Time Survey, CRTS (2005-2014)
- LINEAR (2003-2008)
- SDSS + Stripe82
- PS1
- DECAPS
- ALLWISE + NEOWISE (2010+)
- FIRST and LOFAR (radio)

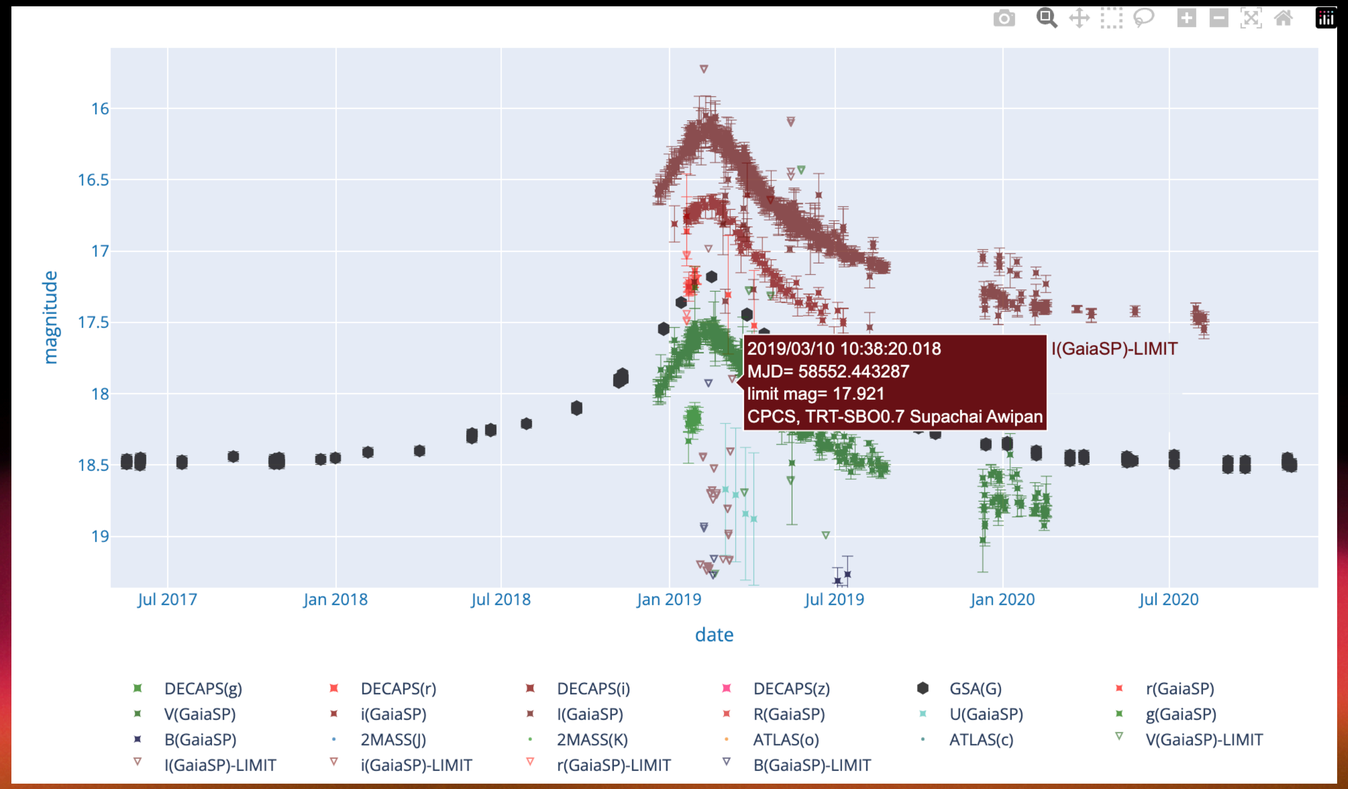
to be added soon:

- + OGLE, KMT_Net, MOA microlensing events
- + OGLE variable stars
- + DASH Harvard photographic plates (<1900)



cpcs archives

- old CPCS/BHTOM1 data was re-processed and is added as an archive
- there are 400k observations in CPCS!
- data was recalibrated to Gaia Synthetic Photometry
- they are labelled with your original name and observatory with CPCS suffix.



publication

BHTOM2

Gaia19axp

Update Target | Delete Target

Name	Gaia19axp
Right Ascension	216.94333 14:27:46.399
Declination	29.51063 +29:30:38.268
Epoch	2000.0
Galactic Longitude	45.028655
Galactic Latitude	68.703383
Constellation	Boötes
Discovered	2019-03-10 14:03:41
Class	Quasar(QSO)
Phot.Class	Not Ulens 78.0%
Last MJD	-10000.0
Last G Mag	100.0

Generate LaTeX target description

Photometry Stats

Facility	Filters	Number	Min MJD	Max MJD
ALLWISE	WISE(W1), WISE(W2)	177	55210.69	55574.43
CRTS	CRTS(CL)	235	53470.35	56464.28
Gaia Alerts	GSA(G)	139	57037.46	60202.07
NEOWISE	WISE(W1), WISE(W2)	591	56670.95	59752.75
SDSS	SDSS(u), SDSS(g), SDSS(r), SDSS(i), SDSS(z)	37	52821.22	53117.36
ZTF	ZTF(zg), ZTF(zr), ZTF(zi)	1134	58202.38	60124.24

Download photometry stats as LaTeX table

BHTOM2

upload

Photometry | Models | Spectroscopy | Observe | Observations | Publication | Manage Data | Manage Groups

Upload a data product

Here you can upload your photometric and spectroscopic observations for this target. Please refer to the BHTOM manual for details.
Example CSV formats for photometry and spectroscopy. Note, we require MJD (Modified Julian Date = JD-240000.5) in the photometry file!
SExtractor format is required for instrumental photometry. FITS is not supported for spectra yet.
Non-detections are marked with error >= 99.0 (e.g. 99.0, 99.9 etc.)
For photometric FITS processing choose the observatory from the list. You can add a new observatory here.
You can upload up to 5 files at once.

You can also use a python script for external fits upload, see the BHTOM's API documentation

Choose a Files

Choose files No file chosen

Data product type

- (•) Photometry - SExtractor format
- ( ) Photometry - CSV
- ( ) FITS File
- ( ) Spectroscopy

[ ] Dry Run (no data will be stored in the database)

MJD OBS *

MJD OBS *

[ ] Dry Run (no data will be stored in the database)

Observer's Name *

Lukasz Wyrzykowski

Observatory

Force filter

GaiaSP/any

Comment

Comment

Upload

API

docs.bhtom.space

- all functionalities of BHTOM available programmatically!
- upload (fits, dat, spec)
- target list and filtering
- data download
- standardisation results

BHTOM2 API Documentation

Introduction

This is a simple guide for BHTOM's REST API. It lets you use BHTOM webpage features in your own programs. You can get a list of targets, add observations, download data and more. Let's get started!

> **Remember!** To use API you should get your own TOKEN first!

1. AUTHORIZATION API: /api/token-auth/

Description

The `token-auth` API provides a method for users to obtain an **authentication token** by submitting their `username` and `password`. Once you have acquired this token, it allows you to access and utilize all other available APIs.

Endpoint

- **Method:** POST
- **URL:** `/api/token-auth/`

BHTOM2

BHTOM Newsletter

https://groups.google.com/g/bhtomtargets

BHTOM Targets for 08 April, 2024

0 views

Lukasz Wyrzykowski <wyrzykow@gmail.com>

8 Apr 2024, 16:12:21 (5 days ago)

to bhtomtargets@googlegroups.com

Hello,

Greetings from the BHTOM Automated Newsletter!

As of 2024-04-08 14:09:01.478552+00:00, these are the new targets added in the last week with importance greater than 1, sorted by magnitude:

name	ra	dec	mag_last	sun_separation	classification	description
Gaia24bbw	81.371630	39.506760	14.2	65.0	Unknown	candidate microlensing event
Gaia24bbs	270.968180	-28.183980	16.2	108.0	Unknown	bulge candidate microlensing event
Gaia24bau	266.011980	-25.859980	16.7	112.0	Unknown	candidate microlensing event
Gaia24bay	262.530760	-27.944750	17.0	115.0	Unknown	candidate microlensing event
Gaia24adu	205.400100	43.413980	17.3	129.0	Unknown	~1 mag rise in Gaia source coincident with galaxy
Gaia24bbt	264.611000	-33.329870	17.5	113.0	Unknown	bulge candidate microlensing event
Gaia23dkq	183.716870	-19.030480	17.8	162.0	Unknown	Brightening in Gaia source coincident with galaxy 6dFGS gJ121452.1-190150
Gaia23dgk	228.359390	27.081950	18.1	134.0	Unknown	Brightening in Gaia source coincident with galaxy
Gaia23bat	242.658540	-35.559640	18.2	130.0	Unknown	candidate microlensing event
Gaia24bcm	253.619790	-50.373170	18.9	NaN	Unknown	candidate microlensing event
AT 2024fkm	208.285587	35.720493	20.2	136.0	Unknown	Astro-COLIBRI target

In addition, here are some older targets that are currently visible and requested for observations. These targets have an importance greater than 4, a sun separation greater than 70, and a magnitude less than 18. They are also sorted by magnitude.

BHTOM2

BHTOM Newsletter

https://groups.google.com/g/bhtomtargets

In addition, here are some older targets that are currently visible and requested for observations. These targets have an importance greater than 4, a sun separation greater than 70, and a magnitude less than 18. They are also sorted by magnitude.

North (dec>0):

name	ra	dec	mag_last	sun_separation	classification	description
TCrB	239.875676	25.920170	12.3	127.0	Nova	recurent nova predicted to explode 2024/2025
8C0716_714	110.472701	71.343434	14.0	84.0	QSO	high cadence variability suspected
Gaia24ayd	300.825090	30.651260	14.7	74.0	Unknown	bright candidate for microlensing event
Gaia18bwz	174.611270	3.368310	15.3	155.0	CV	Known dwarf nova QZ Vir in outburst
Gaia24azc	296.202220	23.630800	15.4	79.0	Unknown	bright gal.plane source candidate microlensing event or Be-type outburst
NGC5683-Seyfert	218.718578	48.661870	15.5	121.0	AGN	active nucleus of a nearby galaxy for frequent monitoring
SN2024gy	183.963708	13.115589	15.7	156.0	SN	classified SN Ia at 5Mpc
ZTF18aarippg	217.566838	23.062372	16.1	144.0	QSO	Tick-Tok possibly merging Super Massive Black Hole binary
SN2023ixf	210.910654	54.311674	16.8	117.0	SN	Bright supernova in M101
Gaia23dfy	281.922640	9.043970	16.8	94.0	Unknown	red gal.plane source candidate microlensing event rises by 0.7 mag
SN 2024elf	264.113343	39.965370	16.8	102.0	SN	Astro-COLIBRI target
SN 2024eib	200.350801	23.861445	17.0	149.0	SN	Astro-COLIBRI target
Gaia23dgt	204.096070	25.538710	17.1	147.0	QSO	Brightening in Gaia source coincident with Seyfert I galaxy
Gaia24acn	298.644780	30.361130	17.2	76.0	Unknown	Candidate microlensing event
SDSSJ094533.99+100950.1	146.391622	10.163917	17.8	127.0	QSO	Long term variable quasar for monitoring

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BHTOM Newsletter

https://groups.google.com/g/bhtomtargets

South (dec<0):

name	ra	dec	mag_last	sun_separation	classification	description
Gaia23ckh	266.770410	-35.991370	13.0	111.0	Symbiotic star	Mira brightens by 0.8 mag, previous event seen
Gaia23cpd	287.536760	-4.720760	13.8	90.0	Microlensing Event	potential long and bright microlensing event
Gaia19dbf	178.699417	-64.491850	14.2	121.0	Unknown	Possibly a YSO
Gaia23dpn	220.154710	-57.762400	14.4	126.0	Microlensing Event	bright red gal.plane source candidate microlensing event rises by 0.8 mag
V4370 Oph	264.987833	-26.461647	15.1	113.0	Nova	Astro-COLIBRI target
Gaia23cyl	266.467690	-42.760060	15.5	110.0	Microlensing Event	microlensing event in the bulge
Gaia23bsf	276.583080	-14.036970	15.8	102.0	Unknown	unknown
AT2024eff	87.924542	-19.218400	16.1	75.0	Unknown	possible nuclear transient, TDE candidate
Gaia23bzg	195.332390	-14.415280	16.3	173.0	QSO	Brightening in known QSO
Gaia24amo	249.148921	-53.749919	16.4	118.0	Unknown	candidate microlensing event, possibly now on the rise
PMNJ0730-6602	112.706495	-66.038578	16.5	99.0	AGN	IAUZ Target
CTS_C30.10	71.833281	-45.627319	16.8	72.0	QSO	Long term variable quasar for monitoring
Gaia23bsd	273.561870	-22.319870	17.0	105.0	Unknown	very slowly rising object, candidate microlensing or Be or YSO
Gaia23cmf	266.551870	-21.014000	17.1	112.0	Microlensing Event	candidate microlensing event
Gaia23cxu	235.890310	-55.429890	17.1	123.0	Microlensing Event	candidate disk microlensing event
AT2024bgz	146.019850	-4.201358	17.1	129.0	TDE	New TDE, now is approaching the LC peak
SN2013bw	161.718208	-1.390811	17.3	144.0	SN	close to SN2024hw
Gaia24ata	188.027640	-48.157800	17.4	138.0	Unknown	candidate long microlensing event far from the Gal Plane
Gaia23dpi	222.600550	-66.066000	17.6	119.0	Microlensing Event	candidate long microlensing event or Be star
Gaia21cbi	122.889030	-80.519340	17.6	100.0	Unknown	~0.5 mag rise in Gaia, WISE and GALEX source
Gaia23cnm	285.322920	-18.717130	17.6	94.0	Unknown	slow and long rise, possible microlensing or YSO
Gaia23dgf	120.642180	-2.372900	17.8	104.0	TDE	~0.3 mag rise in Gaia source

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BHTOM Newsletter

https://groups.google.com/g/bhtomtargets

Last week's targets observed:

camera	target_names
ASV60_FLI	3C454.3
AsiagoAO-0.67_G4-16000	AT2023zgo, Gaia19bzp
Flarestar-MPC171_G2-1600	Gaia24ayd, TCrB, Gaia23cpd
GeoNAO_SXVR-H36	Gaia23dpn, Gaia23dqt, SN2024gy, Gaia23dau, Gaia24alm
HAO68_G2-1600	Gaia24ayd, SN 2024eib, NGC5683-Seyfert, 8C0716_714, TCrB, Gaia24acn, ZTF18aarippg, Gaia24aup, Gaia23dau, SN2023ixf
Kryoneri-1.2_Andor-Zyla	TCrB, SN2024gy, Gaia18bwz, SN2023ixf
LCOGT-CTIO-1m_4K	Gaia24ata, Gaia24alk, Gaia23cbf, Gaia23cvm, Gaia24ams, Gaia23cvq, Gaia24amf, Gaia23cme, Gaia23cnu, SN2023utm, Gaia23cuq, Gaia23cpd, Gaia18dif, Gaia23dpi, Gaia23cvl, Gaia23dpd, Gaia23dpn, Gaia23cvx, Gaia24aom, Gaia23dta, Gaia23cxu, Gaia24amo, Gaia24asr, Gaia24amk
LCOGT-MCD-1m_4K	Gaia23cua, Gaia23cri, Gaia23dau, Gaia23dgt
LCOGT-MCD-40cm_SBIG6303	SN2024gy
LCOGT-SAAO-1m_4K	Gaia23dpd, Gaia24ata, Gaia23cuq, Gaia23dpn, Gaia23dta, Gaia23cnu, Gaia24amo, Gaia23cbf, Gaia23cxu, Gaia23dfy, Gaia23dpi, Gaia24asr, Gaia24amk
LCOGT-SS-1m_4K	Gaia23cuq, Gaia23dpn, Gaia23cvx, Gaia23dta, Gaia23cvm, Gaia24asr
LCOGT-Teide-1m_4K	Gaia23cvq, Gaia23dgt, Gaia23cnu, Gaia23cua, Gaia23cri, Gaia23dau, Gaia23dfy
LCOGT-Teide-40cm_SBIG6303	SN2024gy
OAUJ-CDK500_U47	TCrB
ROAD_QHY600M	Gaia22bpl, Gaia23dpn, Gaia23dnm, Gaia23cpd, Gaia20fnr, Gaia23dit, Gaia24aeh, Gaia24amo, Gaia21ccu, Gaia24ach
RRRT_SBIG-STX16803	TCrB
ZAO_G2-1600	TCrB, Gaia24ayd, SN2024gy, 8C0716_714

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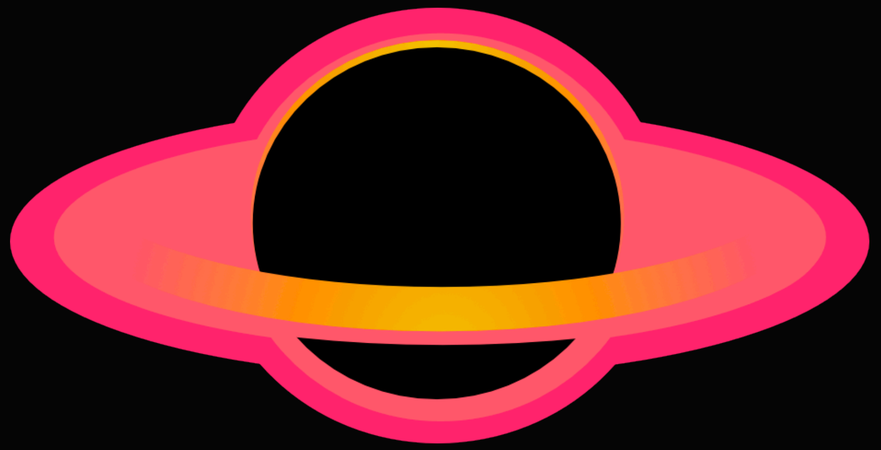
BHTOM Newsletter

https://groups.google.com/g/bhtomtargets

Last week's fits uploads score (sorted by count)

observatory-user	count
Franz-Josef Hambsch (ROAD_QHY600M)	879
Charles Galdies (ZAO_G2-1600)	168
Uliana Pylypenko (LCOGT-SAAO-1m_4K)	103
Nada Ihanec (LCOGT-CTIO-1m_4K)	89
Uliana Pylypenko (LCOGT-CTIO-1m_4K)	87
Nada Ihanec (LCOGT-SAAO-1m_4K)	58
Staszek Zola (OAUJ-CDK500_U47)	47
Alexios Liakos (Kryoneri-1.2_Andor-Zyla)	40
Jan Kåre Trandem Qvam (HAO68_G2-1600)	37
Nada Ihanec (LCOGT-Teide-1m_4K)	35
Nada Ihanec (LCOGT-SS-1m_4K)	32
Teimuraz Kvernadze (GeoNAO_SXVR-H36)	28
Uliana Pylypenko (LCOGT-Teide-1m_4K)	26
Stephen M. Brincat (Flarestar-MPC171_G2-1600)	22
Staszek Zola (RRRT_SBIG-STX16803)	15
Tom Killestein (LCOGT-Teide-40cm_SBIG6303)	15
Uliana Pylypenko (LCOGT-MCD-1m_4K)	13
Nada Ihanec (LCOGT-MCD-1m_4K)	6
Rachel Street (LCOGT-SAAO-1m_4K)	6
Rachel Street (LCOGT-Teide-1m_4K)	5
Rachel Street (LCOGT-CTIO-1m_4K)	5
Tom Killestein (LCOGT-MCD-40cm_SBIG6303)	3
Andrea Reguitti (AsiagoAO-0.67_G4-16000)	2
Uliana Pylypenko (LCOGT-SS-1m_4K)	2
Rachel Street (LCOGT-MCD-1m_4K)	1
Przemyslaw J. Mikolajczyk (ASV60_FLI)	1



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