

How to use Black Hole Target Observation Manager?

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UNIVERSITY of warsaw









///AkondLab.



BHTOM is here -> <u>https://bh-tom.astrolabs.pl/</u>

BHTOM Targets Target Grouping Observatories About



Welcome to Black Hole TOM, built using the TOM Toolkit. Github here. To build your own TOM (Target Observation Manager), check out the getting started guide.

The Black Hole TOM is an interface for viewing and sharing observational photometric and spectroscopic data of time-domain targets, and for requesting and managing follow-up observations obtained with a network of telescopes.

Version 1.1 (Dec.2020): processing of fits images (PSF or aperture photometry) is now available, along with photometric calibrations using Cambridge Photometric Calibration Server.

The BHTOM was built within Time-Domain Work Package of the OPTICON EC/Horizon2020 grant no. 730890.

The BHTOM is co-developed and integrated by the Akond Lab company.



Black Hole TOM v.1.1

(Image courtesy of Ute Kraus.)

BH TOM MANUAL (v.1.1)

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Creating an account

Target	s Target Grouping Observatories About	
	Login*	
	Login*	
	Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only.	
	First name	
	First name	
	Last name	
	Last name	
	Email*	
	Email*	
	Latex name	
	Latex name	
	Latex affiliation	
	Latex affiliation	
	Address	
	Address	
	Password*	Priviledge
	Password*	· can ad
	 Your password can't be too similar to your other personal information Your password can't be a commonly used password. Your password can't be entirely numeric. 	process
	Password confirmation*	· can ad
	Password confirmation*	Carrau
	Enter the same password as before, for verification.	· can do
	Groups Add Observatory	· · · · · · · · ·
	Add Target	· can dis
	Show Targets	· can up
	Upload File	
	About_me	
	About_me	

Each registration will be approved by the admin. If you are a new to this, please write some words describing your professional self and why do you want to use this tool.

You will be emailed when the account gets accepted.

es you request:

- d/register observatory for photometric sing
- Id new targets to the main list, create own lists
- wnload images and light curves
- splay the list of targets
- load files (fits) for photometric processing

Target list

Targets Target Grouping Observatories About BHTOM

Target Map (equatorial)

this tab to see main target list



•	Event Name/Aliases	RA	Dec	Number of Observations
•	Gaia20fnr	90.267	-18.9677	776
•	Gaia18cbf	241.1619	-41.10483	3350
	Gaia20enh	245.84457	-55.55372	75

Targets Target Grouping Observatories About ВНТОМ

	Gaia19duw	298.19944	42.07147	23678	18.47	5.0	31.1	3.0	51.9	65
•	Gaia19dqd	243.72536	-40.17822	140	18.03	2.0	112.1	5.0	44.8	41
•	Gaia19apc	290.98676	14.08804	94738	16.2	5.0	41.5	5.0	41.5	37
•	Gaia20erh	82.45271	15.42842	188	18.27	8.0	14.2	3.0	37.9	156
«	1 2 3 4 »									

Filter targets



RA, Dec, Search Radius (degrees)

Target list

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targets filtering at the bottom of page



Viewing the light curves

Gaia19dke

Update	Delete	Fetch target names		Dh
Names		Gaia19dke		FI
Farget Typ	e	SIDEREAL		
Right Asce	nsion	291,49451		
		19:25:58.682	2	
Declinatio	n	28.40686		
		+28:24:24.69	96	
Epoch		2000.0		
Galactic Lo	ongitude	62.01112881	10184644	
Galactic La	titude	5.704135187	7425682	
gaia_alert_	name	Gaia19dke		
calib_serve	er_name	ivo://Gaia19	dke	
ztf_alert_n	ame			
aavso_nan	ne			
FNS_ID		AT2019ndl		
classificati	on	long-term m	icrolensing	
		event with p	arallax	
weet		False		
dlastobs		2459204.204	41666666	
maglast		0.0		
priority		10.0		
dicovery_d	ate			Daw
cadence		1.0		Dowi

notometry 13 -14 -15 -16 -17 -18 -19 -20 -2015

Photometry

nload photometry data

this tab to see the photometric data

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Viewing the light curves

Gaia19dke

Update	Delete	Fetch target names	
Names		Gaia19dke	
Target Typ	e	SIDEREAL	
Right Asce	nsion	291.49451	
		19:25:58.682	2
Declination	n	28.40686	
		+28:24:24.69	6
Epoch		2000.0	
Galactic Lo	ongitude	62.01112881	0184644
Galactic La	titude	5.704135187	425682
gaia_alert_	name	Gaia19dke	
calib_serve	er_name	ivo://Gaia19	dke
ztf_alert_n	ame		
aavso_nam	ne		
TNS_ID		AT2019ndl	
classificati	on	long-term m event with p	icrolensing arallax
tweet		False	
jdlastobs		2459204.204	1666666
maglast		0.0	
priority		10.0	
dicovery_d	ate		
cadence		1.0	

Photometry 13 -14 -15 -

Photometry

Download photometry data

this tab to see the photometric data

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Viewing the light curves





Photometry



Update	Delete	Fetch target names			
Names		Gaia20fnr		Spectro	scopy
Target Typ	e	SIDEREAL			
Right Asce	nsion	90.267			
		06:01:4.080			
Declinatio	n	-18.9677		8.0e-3	
		-18:58:3.720			
Epoch		2000.0		6.0e-3	
Galactic Lo	ongitude	224.8775082	24442153	10- 3	
Galactic La	titude	-19.3723609	70063426	4.0e-3	
				2.0e-3	
gaia_alert_	name	Gaia20fnr		2.00 5	
calib_serve	er_name	ivo://Gaia20	fnr	0.0e+0	
ztf_alert_n	ame				
gaiadr2_id	le	2990431491	637998848	-2.0e-3	ľ
TNS_ID		AT2020ably			
classificati	on	Potential bri microlensing	ght g event	-4.0e-3	
tweet		False			450
jdlastobs		2459221.397	75941		
maglast		12.87			
priority		10.0		Download sp	pectrosco



Adding a target

BHTOM Targets Target Grouping Observatories About

Target Map (equatorial)



•	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]
•	Gaia20fnr	90.267	-18.9677	776	12.87	10.0	12.6	0.1	1260.3	135
•	Gaia18cbf	241.1619	-41.10483	3350	0.0	10.0	112.8	1.0	1128.2	55
•	Gaia20enh	245.84457	-55.55372	75	16.53	8.0	113.1	1.0	904.7	45

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Add/Remov	e from	group	bing

Add Remove

Adding a target - completing the data

🚔 ВНТОМ	Targets Target Grouping Observatories About
	Search Catalogs for a Target
	Term
	Service
	Gaia Alerts
	search







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ould register an observatory in your account if you want a datapoint to be labeled

I photometry for it. You can choose one from the list of already registered observatories,

CPCS Hashtags are your unique login details per observatory, which can be used in the Cambridge Photometric Calibration Server. However, you can also upload your data to the CPCS directly

Act	ivation	Comment	Update	Delete

Add a new Observatory/Instrument to your list.

Here you can add a new observatory/instrument to your list in two ways. You can choose an observatory from the list of already registered ones. This will generate a new hashtag for CPCS with your name. If your observatory is not yet registered you can create a new entry.



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LCOGT-SS-1m_4K JENA90_STK ✓ OSTROWIK_TEK512 VATT_Vatt4k LCOGT-CTIO-1m_4K LCOGT-SAAO-1m_4K LCOGT-MCD-1m_4K MOLETAI-35cm_CCD4710 IAC80_CAMELOT OAC91_KAF1001E OHP12_ANDOR-936 TERSKOL-2m_FLI-PL4301 SUHORA60_APOGEE MOLETAI-165cm_CCD4710 SOLARIS1_ANDOR-939 SOLARIS2_ANDOR-939 SOLARIS3_ANDOR-939 SOLARIS4_ANDOR-939 SMARTS1.3_ANDICAM REM_ROS2 WIEN0.8_SBIG LOIANO1.52_BFOSC

ROAD_FLI-KAF-16803

BIALKOW_ANDOR-DW432



Create a new Observatory.

Please fill the form below, check BHTOM manual for details. Your entry has to be then activated by the Administrator.

Matching radius is the expected astrometric accuracy of your observatory. The sample fits file is necessary for new observatories for verification of the automatic photometric processing. OBSINFO file describes the technical details of your observatory. The template for this text file can be downloaded from here. Please refer to the BHTOM Manual or get in touch.

Observatory name	4 4	### 'CCDPhot-TEMPLATE_obs. ###	<u>info', ver</u> . of F	eb 2, 2020.	• <u>Contact</u> : mi	ikolajczyk@astro.uni.wro	oc.pl, pzielinski@astrouv	v.edu.pl
Observatory name		### (<u>remove this comment</u>): ### ### ###	This is the tem and remove all column is just. After you finis INSTRUME are eq	blate file the comment to inform y h filling wal to the	for FITS hea ts (marked wi you precisely in this form, yalues you p	aders standardization to (th ###). Column no. 3 (/ what should be put in , please name this file provide below (so in cas	ool within CCDPhot pipels (standard KEYWORD) is not the value section. You n as OBSERVAT INSTRUMENT of se of this template: DAN-	ine. Fill in the fo t to be changed. Co nay change it, if y obs.info, where OBS -SPM Marconi 3 obs.
Longitude		### # DESCRIPTION #	KEYWORD (in FITS)	KEYWORD (standard)	FORMAT	VALUE(s)	COMMENT	CONF_FLAG ([T] <u>rue/[F]alse</u>)
Longitude sample	FITS	# ### ### (<u>remove this comment</u>): ###	Positive longit	ude is W, j	positive lati	itude is N. Please provi	ide these values (along y	with altitude) with
Latitude image sho Latitude	ould be d for	<pre># OBSERVATORY Observatory Observer Observatory longitude [de Observatory latitude [de Observatory latitude [m] Telescope</pre>	: OBSERVAT : : OBSERVER : eg] : LONGITUD : g] : LATITUDE : : ALTITUDE : : TELESCOP :	OBSERVAT OBSERVER LONGITUD LATITUDE ALTITUDE TELESCOP	: str : str : float : float : float : str	: <u>OAN-SPM</u> : - : 115.466666667 : 31.04527778 : 2790 : <u>Richey Chretien 1.5</u> m	: <u>observatory</u> ID : <u>observer</u> ID : <u>deg</u> : <u>deg</u> : <u>meters</u> : <u>telescope</u> ID	: F : F : F : F : F
Matching radius Check	ing	### ### (remove this comment): ### ###	Remember that i In case of this TIME-OBS may be	f the Value section, empty only	: str e column is e all the infor y if DATE-OBS	<pre>mpty, it has to be read mation (apart from time is in format specified</pre>	from FITS header, so Fi system) has to be provi below.	: F ITS keyword column ided inside FITS he
Arcsec Only instrumental photor		<pre># TIME (start of exposition Time system Date Time Julian date Exposition time</pre>	n) : DATE-OBS : UT : JD : EXPTIME	TIMESYS DATE-OBS TIME-OBS JD EXPTIME	: str : <u>yyyy-mm-ddT</u> : <u>hh:mm:ss</u> : float : float	: UTC : used : - : date : - : time : - : middl : - : secor	time standard & time (start of <u>exposit</u> (<u>beginning</u> of <u>exposition</u> le of <u>exposition</u> ads	: F (jon) : F) : F : F : F
Sample fits Przeglądaj Nie wybrano pliku. Obs Info	tails of your / instrument	### (<u>remove this comment</u>): ### ### ### ### ### ### ### ### ###	Fields marked w your instrument you need to spe images (DARK), corresponding b The position an and North to be your detector i In case of pixe North Up and Ea Telescope magni	ith * are , devided cify which light frame and, f.e. gle tells located s rotated l scales, st to the tude limit	dependent on by " ". Also, keywords are es (OBJECT). "B" and so on the pipeline o. Ideally, y somehow diffe please specif Left, please	each other. As you can you can rewrite values responsible for flat-f In case of "Filters" yo how to rotate the image value of the position an erently from these even by these values as preci- provide proper negative	see you may specify more of "Image type" and "Fi fields (standard ky FLAT) ou can change position of e in order to get East to agles should be equal to angles, please do specif ise as you can. If your is e value.	than one camera p ilters". In case of), biases (BIAS), o f the filter, f.e. o the Left side of 90, 180, 270, 360 fy exact value. image has to be fli
Przeglądaj Should be produced be	ovided here he template	<pre>### # INSTRUMENT Instrument name Detector X size [pix] Detector Y size [pix] Binning* Instr. mode, readout spec Gaint</pre>	: INSTRUME : : NAXIS1 : : NAXIS2 : : BIN : ed* : GAIN :	INSTRUME NAXIS1 NAXIS2 BIN READTIME GAIN	: str : int : int : int : int	: Marconi_3 : - : 1 1 : 2000 16000		: camera l : pixels : pixels : bin=1 or : ns/pix : c/Diu
Comment		Read-out noise* Saturation limit*	· - · ·	RDN0ISE SATURATE	: float : int	: 1.80 1.00 : 32000 45000 : 0.0001702 0.000170	12	: ADU : ADU : ADU

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: F : F

List of observatories

List of your registered observatories/instruments you can use for uploading the data for processing. You should register an observatory in your account if you want a datapoint to be labeled with your name.

Here you can add a new observatory to your list if you are planning to upload images or instrumental photometry for it. You can choose one from the list of already registered observatories, or create a new one. Note that different instrument (e.g. CCD) on the same telescope counts as a different observatory. CPCS Hashtags are your unique login details per observatory, which can be used in the Cambridge Photometric Calibration Server. However, you can also upload your data to the CPCS directly from BHTOM instead.

My Observatories All							
Add new observatory							
Observatory Name	Lon	Lat	CPCS Hashtag	Activation	Comment	Update	Delete
OSTROWIK_TEK512	338.5792	52.0897	dev_bhtom_OSTROW	True		Edit	Delete
ROAD_FLI-KAF-16803	68.1803	-22.9528	bhtom_ROAD_FLI-KA	True		Edit	Delete
BIALKOW_ANDOR-DW432	343.341944	51.474167	bhtom_BIALKOW_AN	True		Edit	Delete
LCOGT-SS-1m_4K	210.9291229	-31.2727986	bhtom_LCOGT-SS-1n	True		Edit	Delete
JENA90_STK	348.51583333	50.92888889	bhtom_JENA90_STK0	True		Edit	Delete
LCOGT-CTIO-1m_4K	70.8047889	-30.1673833	bhtom_LCOGT-CTIO-	True		Edit	Delete



Photometric data uploading

BHTOM Targets Target Grouping Observatories About

Gaia19dke

Update	Delete	Fetch target names	Upload a dat
Names Target Typ Right Asce Declin	oe ension	Gaia19dke SIDEREAL 291.49451 19:25:58.682 28.40686	Here you can upload details. Example CSV format supported for spectr For photometric FITS
na mus	ime in st be p	CPCS rovided 1128810184644	Files Przeglądaj Nie Data product type
Gala gaia_alert_	name	./04135187425682 Gaia19dke	 Instrumental phot Fits image for phot Spectrum as ASCI Photometric time
calib_serv	er_name	ivo://Gaia19dke	MJD OBS
ztf_alert_n aavso_nan	ame ne		MJD OBS
gaiadr2_id TNS_ID		AT2019ndl	Exposure time (sec)
classificati	on	long-term microlensing event with parallax	Exposure time (sec



a product

Photometry

your photometric and spectroscopic observations for this target. Please refer to the BHTOM manual for

for photometry and spectroscopy. SExtractor format is required for instrumental photometry. FITS is

processing choose the observatory from the list. You can add a new instrument here.



Photometric data uploading - ASCII file

Photometry

BHTOM Targets Target Grouping Observatories About

Gaia19dke

Update	Delete	Fetch ta	rget names			Upload a da	ta
lames			Gaia19dke			Here you can uploa	d yo
arget Typ	e		SIDEREAL			details.	
light Asce	nsion		291.49451			Example CSV forma	ts fo
			19:25:58.682	2		For photometric FIT	'S pi
Declination	n		28.40686			Files	
			+28:24:24.69	96		Przegladaj	ie w
poch			2000.0				
ialactic Lo	ngitude		62.0111288	10184644		Data product type	
			5.70413518	7425682		Instrumental pho	oton
						 Fits image for ph Fits image for ph 	oto
e text	file		Gaia19dke			 Spectrum as ASC Photometric time 	.II 9-50
	me	# 1	NUMBER		<u>Running obj</u>	ect number	
4 colum	nns	# 2 # 3 # 4	ALPHA_J2000 DELTA_J2000 XWIN_IMAGE		Right ascen Declination Windowed po	sion of barycenter (J of barycenter (J2000) sition estimate along	2000) X

exampl

at least provided: MAG_AUTO **MAGERR_AUTO** ALPHA_J2000 DELTA_J2000

			Spectrum as ASCII	
		Gaia19dke	Photometric time-se	r
#	1	NUMBER	Running object number	
#	2	ALPHA_J2000	Right ascension of barycenter (J2000)
#	3	DELTA_J2000	Declination of barycenter (J2000)	
#	4	XWIN_IMAGE	Windowed position estimate along x	
#	5	YWIN_IMAGE	Windowed position estimate along y	
#	6	MAG_AUTO	Kron-like elliptical aperture magnit	ų
#	7	MAGERR_AUT0	RMS error for AUTO magnitude	
#	8	BACKGROUND	Background at centroid position	
#	9	A_IMAGE	Profile <u>RMS along</u> major axis	
#	10	B_IMAGE	Profile <u>RMS along</u> minor axis	
#	11	FWHM_IMAGE	FWHM assuming a gaussian core	
#	12	CLASS_STAR	S/G classifier output	
		1 291.5328628	+28.4474270 100.4095 38.7342 10.14	0
		2 291.4861426	+28.4490933 307.1425 31.1673 10.84	1
		3 291.5498720	+28.4520085 25.3475 15.2787 10.32	1
		4 291.5208246	+28.4487692 153.6870 32.1969 11.36	9
		5 291.4604822	+28.4523428 420.6172 15.2423 12.80	7
		6 291.4921082	+28.4526426 280.9579 12.9566 12.67	6



Photometric data uploading - ASCII file



 Instrumental photometry file (SExtractor format) • Fits image for photometric processing

Photometric time-series (CSV)

select matching radius to match [RA, Dec] with catalogue coordinates

Exposure time (sec)

Default for the Observatory

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

select the observatory where the data were taken

select the catalogue filter to calibrate the data



Photometric data uploading - FITS image

ВНТОМ Targets Target Grouping Observatories About

Gaia19dke

Update	Delete	Fetch target names				
Names		Gaia19dke				
Target Typ	e	SIDEREAL				
Right Asce	nsion	291.49451				
		19:25:58.682				
Declinatio	n	28.40686				
		+28:24:24.696				
Epoch		2000.0				
Galactic Lo	ongitude	62.0111288101	184644			
Galactic Latitude		5.70413518742	25682			
gaia_alert_name		Gaia19dke				
calib_serve	er_name	ivo://Gaia19dk	e			
ztf_alert_name aavso_name gaiadr2_id						
TNS_ID		AT2019ndl				
classification		long-term micr event with para	olensing allax			
tweet		False				

Photometry	Spec
Upload a d	ata
Here you can upl details.	oad yo
Example CSV form supported for spe	nats fo ectra.
For photometric I	FITS pi
Przeglądaj	Nie w
Data product type	e

- Fits image for photometric processing
- Spectrum as ASCII
- Photometric time-series (CSV)

Matching radius

Default for the Observatory

Observatory

tweet

Pawel Zielinski Logout Observe uploading FITS Upload Obser ctroscopy image after standard product calibration (bias, dark, our photometric and spectroscopic obse OM manual for flat-field frames reduction) or photometry and spectrosco iotometry. FITS is a vatory from the list. You can add a new instrument here. rocessing choor ybrano plików. **FITS files processing** (automatic, based on Instrumental photometry file (SExtractor format) information provided during creation of account and approved by admin)

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



Photometric data uploading - FITS image



select matching radius to match [RA, Dec] with catalogue coordinates

- Instrumental photometry file (SExtractor format)
- Fits image for photometric processing

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

select the observatory where the data were taken

select the catalogue filter to calibrate the data



Checking the results of photometric calibration this tab to see the uploaded data Spectroscopy Upload Manage Groups Photometry Observe Observations Data Fetch target names Your file All Gaia19dke SIDEREAL File Photometry Туре Observatory 291,4945* ccd00027_dW3SM... 451.dat Fits image OSTROWIK_TEK512 Feature ccd00027.fts 450.dat Fits image OSTROWIK_TEK512 Feature ccd00035_OSZQi... 448.dat Fits image OSTROWIK_TEK512 84644 Feature 425682 Instrumental photometry 437.dat OSTROWIK_TEK512 Feature aa19dke 437.dat Fits image OSTROWIK_TEK512 ccd00035.fts ivo://Gaia19dke Feature ccd00034.fts Fits image OSTROWIK_TEK512 434.dat Feature AT2019ndl ccd00038_FYmns... OSTROWIK_TEK512 430.dat Fits image Feature long-term microlensing event with parallax ccd00038.fts 429.dat OSTROWIK_TEK512 Fits image False Feature 2459204.2041666666 ccd00027_Hr6TY... 426.dat Fits image OSTROWIK_TEK512 0.0 Feature 10.0 140722-0339_s.... Fits image OSTROWIK_TEK512





BHTOM



Checking the results of photometric calibration

Target: Gaia19dke Fits Photometry Observatory Time Uploaded **Time Photometry** Status MJD Exposure time Calib Filter FITS Filter Magnitude ZΡ Scatter Number of datapoints used for calibration Outlier fraction Matching radius[arcsec] Dry Run (no data will be stored in the database) Comment

BHTOM Targets Target Grouping Observatories About

results of data processing and calibration

Thumbnail



diagram showing best matching to catalogue data in selected filter

original FITS image and ASCII file with instrumental photometry

Open in JS9



Photometric data uploading - CSV table

Photometry

BHTOM Targets Target Grouping Observatories About

example

Gaia19dke

	Update	Delete	Fetch target names	U	lpload	d a data	
	Names		Gaia19dke	Н	ere you d	an upload y	0
	Target Typ	e	SIDEREAL	de	etails.	,	
	Right Asce	nsion	291.49451	Ð	ample C	SV formats f	C
			19:25:58.682	Fo	pported or photor	netric FITS p	ſ
	Declinatio	n	28.40686	Ci	, loc		
			+28:24:24.696		Przoglac	Nio v	
	Epoch		2000.0		rizegią		
	Galactic Lo	ongitude	62.011128810184644	D	ata prod	uct type	
	Galactic La	titude	5.704135187425682	•	Instrum	ental photor	ĩ
				•	Fits ima	ge for photo m as ASCII	ſ
	gaia_alert_	name	Gaia19dke	0	Photom	etric time-se	1
	calib_serve	er_name	ivo://Gaia19dke	C	omment		
		ame					
		ne			Commer	it	
			# FACILITY: LCO		1		
		on	# OBS-NAME: Observer's Nan	ne			
			time		filter	magnitu	ę
SV	table		55959.0699999983		r	15.582	
			55959.0699999983		g	15.676	_
			55959.0699999983		v	15.591	_
			10.0				
		late			Upload		
			10				

Spectroscopy Observe Observatio Upload uploading CSV file with product photometric data ur photometric and spectroscopic observation for or photometry and spectrosco y. FITS is JI SIL avatory from the list. You can add a new instrument here. ocessing choose ybrano plików. netry file (SExtractor format) netric processing photometric time-series, e.g. ries (CSV) downloaded from AAVSO database le error 0.005 0.007 0.008



Spectra uploading

Gaia20fnr

Update	Delete	Fetch target names			
Names		Gaia20fnr			
Target Typ	e	SIDEREAL			
Right Asce	nsion	90.267			
		06:01:4.080			
Declination	n	-18.9677			
		-18:58:3.720			
Epoch		2000.0			
Galactic Lo	ongitude	224.87750824442153			
Galactic La	titude	-19.372360970063426			

Gaia20fnr

ivo://Gaia20fnr

Photometry

details.

supported for spectra.

Files



Data product type

- Spectrum as ASCII

Comment

er_name iame

ne

on

date

gaia_alert_name

example text file with wavelength and flux provided # DATE-OBS: 2019-12-09 wavelength flux 3341.26928710937 1.464014E-16 3345.34836769104 1.447222E-16 3349.4274482727 7.000821E-17 3353.50652885437 4.936740E-17 3357.58560943603 7.570946E-17

Upload





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Thank you!

//AkondLab.

