

POLARIMETRY OF MICROLENSING EVENTS

PRESENTED BY AGNIESZKA GURGUL

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10th OPTICON Gaia Dec. ∞ Science 1 20, 2019 Alerts workshop

MOTIVATION

• Presence of a gravitational lens destroys symmetry



- fast rotation
- tidal deformation of a star
- presence of hot spots and envelopes
- asymmetric environment

LOSTS OF SYMMETRY - POSSIBLE CAUSES

HOT SPOTS ON SURFACE

Factor of amplification decreases non-linearly with distance from its optical axis Amplification in the total flux - closest to the lens - will be enhanced, due to contribution from visible stellar-disk edge



RAPIDLY ROTATING STARS

- ellipticity and gravity-darkening effects break in the symmetry
- stellar ellipticity makes a time shift in the position of the second peak of the polarimetry curves in transit microlensing events

LATE-TYPE DWARFS

• Rayleigh scattering on molecules introduce additional increase of polarization degree - higher signal

CONCLUSIONS

- rotation of polarization plane allows to determine the trajectory of the lens across the sky, but no direction
- from the time shift we can evaluate the ellipticity of projected source surface on the sky plane
- can be an additional criterion to distinguish the microlensing effect and the ordinary variability of star (after symmetry of the light curve and equal amplification in different colours)

REFERENCES:

M.B. Bogdanov, A.M. Cherepashchuk, M.V. Sazhin, Ap 26SS.235..219B, (1996) Simmons J. F. L., Newsam A. M., Willis J. P., 1995a, MNRAS, 276, 182 (1995) Schneider P., Wagoner R. V., ApJ, 314, 154 (1987) S. Sajadian, S. Rahvar, MNRAS 452, 2579–2586 (2015)

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SOLARIS network of autonomous telescopes

ABOT & ASTRODRIVE & A24.NET Comprehensive management of a network of robotic observatories

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GENESIS

SOLARIS \mathcal{S} NETWORK PANOPI



SOLARIS

Project Solaris – a Global Network of Autonomous Observatories detection and characterization of circumbinary exoplanets and eclipsing binary stars







Sybilla Technologies (prime) and Cilium Engineering (subcontractor) conduct the Astrometry24.net under the contract no. 4000119510/17/D/SR funded by the European Space Agency



Solaris-3

Borowiec Laser



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Software suite for robotic astronomical observatories, integrating various hardware, communication protocols, operational principles into one, user friendly package of tools, algorithms, behaviours and user interfaces.

ASTRONOMICAL ROBOT



- observing
- scheduling
- focusing
- weather

• ASTRODRIVE

- data storage and managment
- ASTROMETRY24.NET (A24.NET)
 - source extraction
 - astrometry
 - photometry
 - various analysis tools (SSO, SST, etc.)



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SYBILLA



Software suite for robotic astronomical observatories, integrating various hardware, communication protocols, operational principles into one, user friendly package of tools, algorithms, behaviours and user interfaces.

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WEB SERVICE - CLOUD SERVICE



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WHEREVER YOU ARE...



Chcesz skorzystać z nowych funkcji Twittera? Po prostu się zaloguj.

Q 2

Zaloguj się

Zarejestruj się

Może Ci się też spodobać · Odśwież



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BlackGEM Array @BlackGEM_Array





1 MeerLICHT Telescope podał/a dalej

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controlled from Earth, but has anyone ever controlled a telescope on Earth (halfway) from space??? @MeerLICHT_ZA from KL0597 somewhere above

Angola.....

8 meerlicht.org

@patrickwoudt

🖽 Dołączył grudzień 2012

🔀 222 zdjęcia lub filmy



the MeerKAT array. Collaboration ZA-NL-

UK. Donate? Contact @paulgroot or



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SST PROGRAM (EXAMPLE)

- 1 text field for simple observing program name 2 – observatory to be the scheduler
- 3 how many times the observing program should be repeated 4 – information on the scheduling mode, if time based the observing program will be automatically repeated within the requested time boundaries, if not time based the observatory will execute the schedule within given time limits and once finished will move to next target
- 6 how many times the observations for the object should be
- 7 object search with autocompletion
- 8,9 (TLE) Two Lines Elements (ephemeris)
- 10 visibility graph for selected object
- 11 combo box allowing for selection of the filter available at
- 12 field for a new filter in the sequence (multi filter
- 13 estimated total time required to execute the program
- 14 buttons allowing for saving the program for use in the
- future, submitting it immediately to the observatory or
- cancelling the scheduling

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WEB INTERFACE

ASTRODRIVE - CLOUD STORAGE

file service dedicated to managing astronomical data

DRAG'N'DROP IMPORT

upload multiple files and process them using specified workflow

BUILT-IN FITS SUPPORT

in-browser file display, manipulation, statistics

PROCESSING RESULTS

select and display details of detected object, export to CSV/JSON

BATCH PROCESSING

WORKFLOW MANAGEMENT

CROSS-PLATFORM WEB APP





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CROSS-PLATFORM WEB APP

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DISPLAY, ANALYSE AND EDIT

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- No need to integrate dozens of different programs
- Less wasted observing time due to software issues
- Less manual operation
- More well-used observing time due to optimized software and observing strategies
- More opportunities (stars, clusters, space debris, asteroids, satellites, planets, galaxies).
- More fun from acquiring new observations and more data which can be used

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Thank You for attention!











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