Białków Observatory - indispensability of small ground-based telescopes in the era of satellite observations

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Białków Observatory - location

Altitude ~150m
Białków Observatory – astrophysics and heliophysics

Coronograph with 53-cm lens.
A bit of history...

- The observatory was established by Leo von Wutschichowski in the 80's of XIX century.
- After his death in 1927, the observatory was given to Wrocław University.
- The old, 25-cm refractor, was replaced by the 60-cm Cassegrain telescope in 1976.
Some parameters

- **Telescope:**
  - 60-cm Zeiss Cassegrain,
  - focal length: 750 cm,
  - image scale: 27.5″/mm.

- **CCD camera:**
  - back-illuminated ANDOR iKon-L DW432-BV,
  - ccd size: 1250 x 1152 pix, pixel size: 22.5 μm,
    field of view: 12.89′ x 11.88′, image scale: 0.619″/pix.

- **Filters:**
  - $BV(RI)_C$ Johnson-Kron-Cousins,
  - Hα filters: narrow 3-nm FWHM and wide 40-nm FWHM.

- **Weather conditions:** seeing ~2.5″, about 1200 observing nights in the years 2005 – 2017 (biased by the amount of observers): ~92 nights/year.

- **Automated calibration and half-automated profile and aperture photometry and astrometry (CCDPhot).**
Białków astrophysics

Two main observing programs:
- From 1992 - searching for hot, pulsating variable stars in young open clusters.
- From 1997 - searching for variable stars in globular clusters.
- + Kepler, Gaia alerts, and other follow-ups.
NGC 6910 campaign

- Kołaczkowski et al. (2004): 4 β Cep in NGC 6910.

A CCD Search for Variable Stars of Spectral Type B in the Northern Hemisphere Open Clusters. VI. NGC 6910

by

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NGC 6910 campaign

- In the years 2005 – 2007 and 2013.
- The most usable photometric data: Białków and Xinglong (China) observatories (157 nights).

*Figure 7.* Fourier frequency spectra for 2006 Białków data of NGC 6910 18. Several steps of prewhitening are shown: original data, after removing of 3, 7 and 12 periodic terms. Note that ordinate has different scale in different panels.

Pigulski 2008, JPCS 118, 012011
NGC 6910 campaign

- In the years 2005 – 2007 and 2013.
- The most usable photometric data: Białków and Xinglong (China) observatories (157 nights).
- 8 β Cep-type stars, 125 variable stars (117 new) in total.

Saesen et al., 2010, AN 331, 1080
Możdzierski et al. (in prep.)
Additionally we determined atmospheric parameters and we got time series of variability of spectral lines profiles in order to carry out so called ensemble asteroseismology of B-type pulsating stars in NGC 6910:

- APO – Apache Point Observatory (USA), tel. 3.5 m, echelle 3200 Å – 10 000 Å, R = 31500.
- OHP – Haute-Provence Observatory (Francja), tel. 1.93 m, echelle 3872 Å - 6943 Å, R = 75000.
- NOT – Nordic Optical Telescope (Wyspy Kanaryjskie), tel. 2.56 m, echelle 3700 Å - 7300 Å, R = 46000.
Ha photometry – e.g. NGC 457

- A – NGC 457 members
- B – field stars
- C – double-star sequence of cluster stars
Gaia alerts follow-up

Model by Przemek Mróz  http://www.astrouw.edu.pl/~pmroz/Gaia16aye.html
Gaia alerts follow-up

Gaia16aye

Differential magnitude [mag]

HJD - 2457000.0

Białków Observatory
Gaia alerts follow-up
Large Białków Observatory photometry archive

- About 700 objects.
Some nice Białków pictures at the end...