# The Astronomical Observatory of the West Pomeranian University of Technology in Szczecin, Poland

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# 1 Location of the Observatory

The Astronomical Observatory (AO) of the West Pomeranian University of Technology (WPUT) is situated on the roof of the Inter-Faculty Building (IFB) in the central part of Szczecin. The latitude and longitude of the AO is $54^o$N and $15^o$E, respectively. The lower seven floors of the IFB are used for academic activities and administration, while the $8^{th}$ floor contains the building's technical appliances. On the $9^{th}$ floor there is a terrace and the dome of the AO, which offers a beautiful view of the city and its surrounding area. On a clear day, one can see places as far away as 30 km, such as the windmills in Germany (15 km away) and chimneys of the Lower Oder Power Plant (25 km away). The advantage of the AO's location in the centre of a large city is an easy access for visiting observatory guests. However, the city lights hinder observations of dim objects such as comets, galaxies, and nebulae in the night sky.

Figure 1: Construction of the AO. Standing on the left side is prof. T. Rewaj, the main initiator of the AO. (Privet photo from T. Rewaj)

# 2 The origin of the Observatory

The origin of the AO is closely tied to the $500^{th}$ anniversary of Nicolas Copernicus' birth, which was celebrated in 1973 [1]. Nicolas Copernicus (1473−1543), a mathematician and astronomer of the renaissance and reformation era, who formulated the heliocentric model of the solar system, was born in the town of Thorn (now Torun in Poland) in Royal Prussia, Kingdom of Poland [2]. In 1973, various festivities were held in Poland, and the Polish Ministry of Science

and Education provided funds to commemorate the anniversary. A special committee at the WPUT decided to construct an astronomical observatory with these funds. After consulting with then-astronomy student Aleksander Wolszczan (now a Professor at Cornell University, USA, and the discoverer of the first extrasolar planet), it was decided that the observatory dome (5 m in diameter) and the telescope (refractor) would be purchased from the Carl Zeiss Jena manufacturing company in the former East Germany. The telescope arrived in 1978, but the construction of the AO (see Fig. 1) was delayed by a few years due to a slowdown in construction of the IFB. The observatory was finally opened in the autumn of 1982 [3].

# 3 Observational instruments in the Observatory

## 3.1 The main refractor

The primary telescope in the AO is a lens telescope (refractor) with an objective lens of diameter $D = 15$ cm and the focal length of $\mathrm{f}_{ob} = 225$ cm (see Fig. 2). A functional telescope consists of at least two very different lenses: an objective lens (with a large diameter and long focal length) and an eyepiece (with a small diameter and short focal length). The magnification $M$ of a lens telescope is calculated as the ratio of these two focal lengths, $M = f_{ob}/f_{eye}$. A collection of eyepieces is available (with focal lengths ranging from 0.6 to 4.2 cm), allowing the magnification of this telescope to be varied from 36 to 375. An electric motor enables the telescope to follow the daily movement of the stars by rotating it according to the movement of the sky sphere. The telescope mount is equatorial, which facilitates easy tracking of stars in their daily apparent movement. The equatorial mount requires the telescope's axis to aim at the north sky pole, where the Polar Star is visible. Compared to other modern amateur telescopes, it is not a particularly large optical instrument since the market for astronomical instruments has developed intensively in recent years. Nowadays, professional and amateur astronomers prefer to use mirror telescopes (reflectors) instead.

## 3.2 Solar telescope and a CCTV video camera

The surface of the Sun can be directly observed using a telescope equipped with a special narrow-band filter that significantly reduces the intensity of solar radiation. At AO, there is a small H-alpha telescope manufactured by Lunt company. It has a filter that only transmits a specific deep-red wavelength of a visible spectral line in the Balmer series, with a wavelength of 656.28 nm. This line is emitted when an electron in a hydrogen atom falls from the third

Figure 2: The refractor in the AO (Own work)

to the second-lowest energy level.

In the AO, there is also a CCTV (closed-circuit TV) video camera that participates in the Polish Fireball Network (PFN). PFN is a scientific project of the Polish Academy of Sciences that involves approximately 100 sensitive and wide-angle video cameras located throughout Poland. The main objective of the PFN is to register falling meteors, determine their trajectory in the atmosphere, and identify possible landing sites on Earth's surface.

# 4 What can be observed?

The telescope at the AO can be used to observe various astronomical objects visible in the night sky, such as planets, moons, stars, galaxies, comets, and gas nebulae. The Moon with its craters and mountains is an easy and beautiful target for observations. Saturn is probably the most visually interesting planet, with its rings that can be seen if the magnification of the telescope is greater than 50 times. On the surface of Jupiter, the largest planet in the Solar System, color belts can be seen, and four Galilean moons can also be visible.

On the surface of the red planet Mars, the white polar caps of frozen $CO_2$ can sometimes be observed. Stars are not very interesting to observe through this telescope because their surface cannot be seen due to the vast distances involved (measured in light years). The most interesting galaxy to study is the great galaxy in the Andromeda constellation (designated as M31). The telescope can also be used during the day to observe the surface of the Sun by projecting the image on an attached white screen. During years of the Sun's intense activity (which happens with an 11-year cycle), many dark spots are visible on the Sun's surface.

Figure 3: Preparation of the primary telescope for the public observations (Own work).

# 5 Management of the Observatory

The AO is operated by a group of amateur astronomers who form a local branch of the Polish Association of Amateur Astronomers (PAAA) [4]. These individuals are passionate about astronomy and most of them own their private telescopes. Members of Szczecin Branch of PAAA have built the largest Polish amateur telescope (mirror telescope, $D = 50$ cm), which is movable and used for visual observations. PAAA members make valuable observations using the telescope in the AO and their own equipment. Additionally, every two weeks,

they give an open lecture on astronomy-related topics. They have spent many hours conserving and repairing the telescope in the AO, so it is now in a good shape despite its old age. Once every two weeks, they are available for registered visitors to the Observatory to show them interesting objects currently visible in the sky (Fig. 3).

# 6 Conclusion

The AO plays an essential role as a meeting point for individuals interested in astronomy. It is a place where you can begin your journey into astronomy or deepen your knowledge and expertise. Here, you can meet like-minded people and enjoy your hobby to the fullest. You can also rely on help in purchasing a telescope that is appropriate for you and have the opportunity to discuss your recent observations. As the only amateur observatory in the West Pomeranian Province of Poland, its significance cannot be overstated.

**Acknowledgments**

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# References

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