THE ASTRONOMICAL OBSERVATORY OF THE ODESSA STATE UNIVERSITY

The Astronomical Observatory as the scientific institution was founded in 1871. Now it has two mountaneous and two suburban observational stations, and the base territory in Odessa (T.G.Shevchenko Park, Odessa 270014 Ukraine; e-mail astro@paco.odessa.ua). Director: Prof. Dr. Valentin G. Karetnikov.

The observatory is equipped by two 80-cm, a 60-cm, two 50-cm telescopes, a 35cm Schmidt Camera, a seven-camera Astrograph. Significant part of observations is obtained at other observatories (6m, 2.6m etc.).

The Astronomical Observatory can fulfil the following tasks :

- Photometric observations of the various types of astronomical objects in the spectral region ($\lambda\lambda$ 3500-22000 Å) by the photoelectric (to 11 mag) and the photographic and CCD (to 15 mag) methods. Analysis of the observational data of the constant and variable stars, the meteors, the comets and the artificial space bodies.

- Two-colour photographic study of the variable stars on the archive plates ($m_{pg} < 15^m$, $m_{pv} < 13^m$) since 1957. The total number of the plates exceeds 100,000.

- The low-dispersion spectral observations (to 8^m) in a spectral range $\lambda\lambda$ 3500-6500 Å and their analysis. Modeling of the spectra of the various types of stars, meteors and comets.

- Observations of the rapid processes:
  - the occultations of the stars by the Moon and by the planets with a precision of 0.001 sec.
  - the phenomena accompanying the penetration of the natural and artificial bodies into the Earth' atmosphere.
  - the fast stellar variability by using a two-channel photometer at the Mount Dushak-Eregdag observational station in Turkmenia.

- Position determination of the objects (stars, planets to 10^m), by using the meridional circle. Elaboration of the astrometric catalogs and the investigation of the inertial frame of reference.

- Measurements of the brightness and the polarization of the twilight, night and day sky light in order to obtain the extinction and the dust abundance in the upper layers of the Earth' atmosphere. Modeling of the Earth' atmosphere and its ecology.

- Design and construction of the astronomical telescopes with the diameter of the mirror up to 0.8 m, the devices for operating the telescope and other instruments for astronomical observations (both scientific and amateur).

- Teaching the children and amateur astronomers by the correspondence course, holding the summer school camp, giving the consultations. Elaboration and distribution of the observational programs, instructions, finding charts and ephemerides for the selected variable stars and other objects necessary for carrying out the amateur astronomical observations.

- Computer modeling of the astrophysical processes (radiation transfer, synthetic spectra, polarization, binary star evolution etc.).

- Application of programs for the reduction of the astronomical data (periodogram, multifrequency, scalegram and wavelet analysis of the (irregularly spaced) data with and without a trend by using more than 20 methods, investigation of the period changes, approximation by using the 'smoothing' of the smoothing cubic splines, 'running' ordinary and trigonometric polynomials, 'asymptotic parabolae' etc.). Restoration of the autocorrelation function from the values biased by a removal of an arbitrary trend. Analytic and numerical study of the statistical characteristics of the model parameters and the smoothing functions. Applications of these complimentary methods to time series with an arbitrary nature. Elaboration of programs.