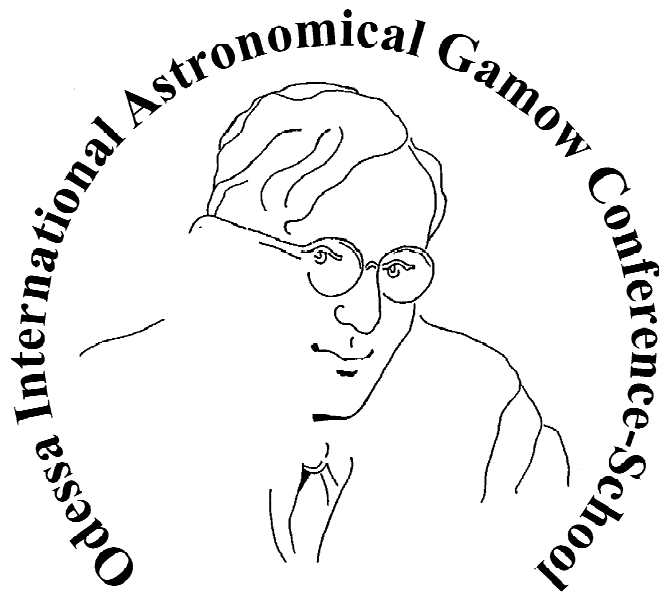


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"ASTRONOMY AND BEYOND: ASTROPHYSICS,
COSMOLOGY AND GRAVITATION, HIGH ENERGY PHYSICS,
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ABSTRACTS

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bly such planets may cause chromospheric activity variations of host stars by resonance gravitational influence. Possible mark of chromospheric activity for sun-like stars is periodical variability of the most strong lines H CaII, K CaII and H-alpha. In photometrical observations it is possible to expect appearance of variability in B, R bands containing these lines, respectively.

Multicolor photometrical observations were carried out using telescope Celestron-14" in BVRI Johnson filters at Lisnyky observational station (Kyiv). For exoplanet systems HD 189733 and HD 68988 it were obtained data during 2020 year (23 nights). Data processing was carried out using Maxim DL 4.60. Light curves were folded with exoplanet orbital periods 2.2 days (HD 189733 b) and 6.3 days (HD 68988 b), phase light curves are presented. Analysis of photometric time series in search for hidden periods was done by light curve and period analysis software Peranso. Estimates of the coincidence of found periods with exoplanet orbital periods and brightness variation amplitudes are made.

SOFTWARE FOR DETERMINING OF THE OPEN CLUSTERS 3D STRUCTURE

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Catalogs with an unprecedented level of accuracy were obtained as a result of the Gaia space mission. The use of data from these catalogs for the open clusters research allows clarifying of their star population and obtaining more accurate estimates of their parameters. The software, developed by the MAO Research Institute, uses astrometric data (proper motions and parallaxes) to determine the size, mean parallaxes, and proper motions of open clusters and their populations. The software can work with any modern catalogs that contain the necessary astrometric parameters. The ultimate goal of the software is to refine the population and study the 3D structure of open star clusters. This report presents the results of processing of the selected 40 clusters from the open clusters catalog (Dias +, 2002, CDS VII / 229) with current updates according to the catalogs GAIA DR2 and GAIA EDR3. The selected clusters are at distances not exceeding 1 kPs, because in this version only original parallax values are used as measure of distances. The algorithm for calculating and separating background and cluster stars in the selected sky areas is based on the assumption that the clusters stars have similar values of their proper motions and parallaxes. The calculation is performed by the method of confidence intervals by successive iterations. Analysis of the results obtained with the catalogs GAIA DR2 and GAIA EDR3 did not reveal statistically significant differences between the obtained data for the most of the selected clusters. Comparison with the data of the catalog (Cantat-Gaudin +, 2020, J/A+A/633/A99) mostly showed good consistency in distances and proper motions, but the population differs significantly in some cases. That leads to differences in other parameters. The probable reasons for such discrepancies and a detailed analysis of several clusters are given.

ANALYSIS AND REPROCESSING OF EARLY KYIV OBSERVATIONS OF ASTEROIDS WITH MODERN REFERENCE CATALOGUES

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Based on the results of processing all photographic observations of minor planets carried out in 1908–1995 at AO TSNU and MAO NASU, data were collected from publications and the MPC database. In total, more than 6,000 positions and magnitudes of asteroids have been cataloged. From the analysis of the collected data, different values of positional accuracy were obtained for different series of observations depending on the reference catalogue of stars.

Taking into account the high accuracy and representativeness of the new modern reference catalogues of stars, the possibilities of processing some of the earliest observations of asteroids are estimated.

As a result, using the catalogues Tycho-2, Gaia DR2, and Gaia EDR3 as a reference, 590 plates exposed on the MAO NASU Double Long-Focus Astrograph in 1951–1986 were reprocessed based on previous old measurements. All new and preceding asteroid positions were compared with the JPL ephemeris. The comparison results show a significant increase in the systematic and random components of positional accuracy for new asteroid positions compared to preceding positions. However, on the whole, the new positions of the asteroids determined in the Tycho and Gaia catalogue systems do not differ significantly from each other.

PRELIMINARY RESULTS OF THE SEARCH FOR ASTEROIDS AND COMETS ON THE PLATES OF THE TAUTENBURG OBSERVATORY (1963-1965)

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The search for small bodies images was carried out on the basis of photographic observations at the Tautenburg Observatory "Karl Schwarzschild" (TLS, [033], 11° 42'40.5"E, 50°58'48.5"N, h = 347,7 m). The observatory archive contains several thousand photographic plates (9213) filmed in 1963–1989 in UBVR bandwidths. The linear dimensions of the plates are 24x24 cm. The working field and the scale are 3.3 x 3.3 degrees and 51.4 "/mm respectively.

Approximately 200 photographic plates were selected and captured between 1963 and 1965 in the V Johnson color system. The reduction of observations was carried out in the GAIA DR2 reference frame. Internal reduction accuracy: rmsA ~ .04, rmsD ~ .05, rmsMg ~ .11. (O-C) differences for the asteroids positions identified on the plates were obtained from their comparison with JPL-ephemeris values.

As a result, a preliminary catalog (in the GAIA DR2 system) of 13 topocentric positions for 8 asteroids.