

PHYSICAL CONDITIONS IN THE PLASMA TAIL OF COMET C/1987 P1 BRADFIELD. S. A. Borysenko¹, Yu. V. Sysonenko¹, I. V. Lykyanyk², O. V. Ivanova¹, A. D. Voyzehovs'ka¹, T. P. Sergeeva¹, A. Golovin¹, ¹Main Astronomical Observatory, NAS of Ukraine, 27 Zabolotnoho, 03680 Kiev, Ukraine, ²Kyiv Shevchenko National University, 2 Glushkov Prosp., Build. 1, 03680 Kyiv, Ukraine, iluk@observ.univ.kiev.ua

For today in archives of observatories a plenty of materials with images and spectra of comets received on photographic plates has collected. Among these materials it is possible to find partially or completely not processed. The majority of pictures have made some years ago but the information is very important for research of physics of space objects. These data allow not only to investigate evolutionary processes in objects where the big number of observational data is important, but also to specify physical parameters in modeling calculations, to accumulate the information about different objects. To not lose archives of data for today in the world virtual libraries of photographic plates in the form of scan-files are created.

For research of physical parameters of plasma tails of comets within the limits of our problem we were the selected photographic images of comet C/1987 P1 Bradfield for 15, 19 November 1987, and also necessary photometric calibrations. Scanning plates was carried out on tablet commercial scanner Microtek Scanmaker 9800XL with slide-module TMA 1600. Use of the tablet scanners, equipped a slide-module of the big format (A3), for scanning astronegatives already is applied for a long time [1]. The data received from such scanned images are used for different scientific problems, for example such as: estimations of coordinates of objects, their brightness, search of variable stars and asteroids.

As well as the majority of scanners of this type Microtek Scanmaker 9800XL has regular errors of system of coordinates. However the technique of their processing offered by authors of work [2] allows to define coordinates with accuracy 0.1 - 0.3" and to spend photometry of stars with a margin error 0.15 - 0.20^m. At scanning parameters were used: dividing ability of 1200 points on inch (the size of pixel 20 microns), mode Grayscale - 16 bit; filters, corrections of scale-function, dynamic range, brightnesses and contrast for formation of the image were not applied. The result file received in tiff-format was transformed in fits-format. The received images of comet and corresponding calibrations have been placed in a database to the address of www.mao.kiev.ua/basa.

Pictures of comet C/1987 P1 Bradfield which were used for research in the given work have been received by N. Kimeridze in Abastuman astrophysical observatory with Schmidt's camera (D = 36 cm, F = 65 cm) on astrophotographic plates A-600 with expositions of 5-6 minutes. For processing a series of observations for November, 1987 was used. In pictures received during this period it is

well enough appreciable narrow prolonged a plasma tail.

Observations data and the diffusion model of G. Nazarchuk and L. Shul'man [3] are used. Longitudinal and cross photometric profiles and respectively theoretical curves of plasma tails of comet Bradfield are constructed. Physical parameters (the acceleration a , the life time of fluorescent ions t , longitudinal D_{\parallel} and cross D_{\perp} diffusion coefficients, magnetic field induction limits B) of plasma tails of comet C/1987 P1 Bradfield for 15, 19 November 1987 are calculated.

Our results show that scanning plates can use for scientific investigation of physical conditions in the plasma tails of comets.

References: [1] Tsvetkov M. K., Stavrev K. Y., Tsvetkova K. P., et al. The wide-field plate database: new development and applications (1998) *Newsletter*. 10, N1.,10-16. [2] Andruk V. N., Ivanov G. A., Pogorel'tsev M. T., Yatsenko A. I. (2005), *Kinematika i Fizika Nebesnykh Tel*, vol. 21, no. 5, 396-400. [3] Nazarchuk G. and Shul'man L. (1968), *Problemy kosmicheskoy phisiki*, 3, 11-24.