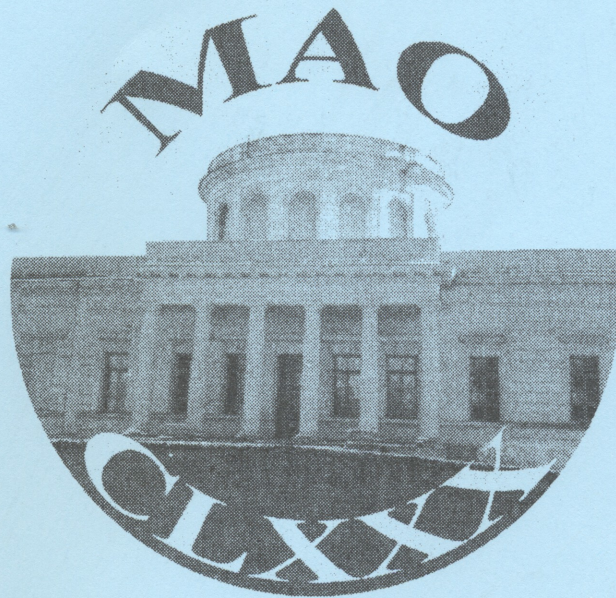


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Extension and Connection of Reference Frames using CCD ground-based Technique



ABSTRACTS

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DETERMINATION OF OPTICAL POSITIONS FOR 22 SOUTHERN EXTRAGALACTIC RADIO SOURCES

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Optical positions relative to UCAC1 for 22 counterparts of extragalactic radio sources in southern hemisphere are presented. The internal accuracy of the positions is of the order of $0''.060$. With the help of astrometric calibration regions, choices of the centering method and the width of the subraster used for object centering are given based on the detailed analysis on results of the centers of star images in CCD frame, and the choice of the suitable plate model for CCD of 1m telescope at Yunnan Astronomical Observatory is also recommended in the paper. A comparison of our results with those of other authors is made.

ПРЕДШЕСТВУЮЩИЕ СИЛЬНЫМ ЗЕМЛЕТРЯСЕНИЯМ ВОЗМУЩЕНИЯ АМПЛИТУД СИГНАЛОВ РАДИОСТАНЦИЙ СЛУЖБ ТОЧНОГО ВРЕМЕНИ

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В статье приводятся результаты сравнительного анализа данных мониторинга землетрясений с магнитудой более 6 баллов и данных по ионосферным возмущениям в целях обнаружения ионосферных предвестников разрушительных землетрясений. На основе ранее полученного положительного результата по предсказанию сахалинского землетрясения 27.05.95., проведен анализ амплитуд СДВ передатчика службы точного времени, согласно которому отмечено существенное увеличение числа ночных возмущений амплитуд, предшествующих сильным землетрясениям. Предлагаются возможные физические механизмы образования аномалий на основе представлений нелокальной статистической механики Власова.

ON THE DISPLACEMENT OF ASTEROID PHOTOCENTRE DUE TO THE SURFACE SCATTERING

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The recent increase of the accuracy of ground-based astrometric observations of asteroids due to the application of CCD-detectors and the use of highly accurate HIPPARCOS asteroid data make essential taking into account the asteroid displacement caused by nonuniform brightness distribution on asteroid apparent surface (limb-darkening, albedo distribution, etc.). For this purpose, the numerical modelling of asteroid brightness distribution for different scattering laws (Lambert, Lommel-Seeliger, Hapke, theoretical and empirical Akimov laws) was carried out. The numerical photometric model of an asteroid which provides the arbitrary asteroid shape, albedo distribution on the surface and scattering law was used. The triaxial ellipsoid with semi-axis ratio $a:b:c=2:1.4:1$ was chosen as a figure of the model. The calculations were carried out for the equatorial aspect of an asteroid. In this case the point on the photometric equator of apparent asteroid disk, on the left and on the right of which the integral brightness are equal, determines the photocentre position.

It was shown that the photocentre displacement essentially depends on the asteroid shape, phase angle and light scattering. Its value can reach $(0.3--0.4)R$ where R is the asteroid angular radius. For the main-belt asteroids with angular sizes $\geq 0.1''$ the displacements can reach the value of $0.02''$ and even more (up to $0.06--0.10''$ for the largest asteroids 1 Ceres, 2 Pallas, 4 Vesta and 324 Bamberga). For the NEAs the photocentre displacements can reach large values because of the large values of phase angles. For example, the Apollo asteroid 4179 Toutatis in December 1992 approached the Earth to 0.024 AU, and its angular size and phase angle were equal to $0.2''$ and 100° , respectively. In this case, the photocentre displacement was equal to $0.07''$. Such values exceed the accuracy of space-based astrometric measurements ($0.015--0.020''$) and the modern ground-based ones (or are compared with them) [1,2]. Therefore taking them into account can noticeably improve the accuracy of asteroid position determination.

The practical recommendations on the determination of the asteroid photocentre displacement are given.

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