Scientific session of the Division of General Physics and Astronomy of the USSR Academy of Sciences (January 18–19, 1978)

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A scientific session of the Division of General Physics and Astronomy of the Academy of Sciences of the USSR was held on January 18 and 19, 1978, at the Lebedev Physics Institute in Moscow. The session heard the following reports:

1. *A. A. Mikhailov*, Precession and the inertial coordinate system.

2. *R. A. Syunyaev*, Bursters: x-ray sources emitting in bursts.

N. B. Brandt, S. V. Kuvshinnikov, A. P. Rusakov, and M. V. Semenov, A high-temperature Meissner effect (a high-temperature superconductivity?) in the compound CuCl.

4. *L. N. Bulaevskii, V. L. Ginsberg, G. F. Zharkov, D. A. Kirzhnits, Yu. V. Kopaev, E. G. Maksimov, and D. I. Khomskii.* The problem of high-temperature superconductivity.

An abstract of one of the reports follows.

A. A. Mikhailov, *Precession and the inertial coordinate system.* A new value for the precession constant was adopted at the 1976 Congress of the International Astronomical Union in Grenoble. The new value is 1″.10 per century larger than that adopted in 1896, which has been universally used. The change has affected slightly all the proper stellar motions which have been determined to date. Although the precession of the earth's axis is known to be due to the attraction of the equatorial bulge of the terrestrial ellipsoid by the moon and sun, it has not been possible to calculate the magnitude of the effect accurately because of inadequate information on the mass distribution both in this bulge and in the earth in general. It has thus been necessary to determine the lunar–solar precession empirically, from observations of stellar coordinates, but this approach is complicated by the proper motions of the stars. In contrast with the lunar–solar precession, the secular displacement of the ecliptic which is caused by the attraction of the planets (the "planetary precession") can be calculated very accurately from theory, on the basis of the well-known masses of the planets. This secular displacement was also refined at the IAU Congress in Grenoble. The difficulties due to the proper stellar motions are now beginning to be eliminated by reference to extragalactic nebulae. This approach was in fact suggested as far back as 1805, by Laplace, but it is only recently that photographs and a two-step determination of the positions of the brightest stars with respect to the faint images of nebulae have made this method the most reliable method for determining the lunar–solar precession constant. At this point only 20 or 25 years have elapsed since the first photographic observations, primarily in the USSR and the USA, so the advantages of this method have not yet been fully realized. For the future this method promises an even more accurate determination of the precession of the earth's axis, so that it will be possible to establish an inertial coordinate system from which rotation is completely eliminated. The origin of this coordinate system will be tied to the barycenter of the solar system, but in the residual translational motion we will still not be able to eliminate or measure the acceleration due to an inhomogeneity of the galactic gravitational field. It is possible that astrophysical considerations or radio-astronomy observations will resolve this question also.

Translated by Dave Parsons

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