

## INTRODUCTION

The driving idea, in organizing this Symposium on "Relativity in Celestial Mechanics and Astrometry" was that, in recent years, the accuracy of several Astrometric techniques has so much increased that relativistic effects are no more marginally mentioned in academic presentations but have become an intrinsic part of the interpretation of all the positional data. Techniques such as V.L.B.I., space probes, lunar lasers, etc... have greatly contributed to reduce the accuracy level to an angular equivalent of a few milliarc-seconds. HIPPARCOS will extend this trend to stellar astrometry and new proposals aim at gaining another one or two orders of magnitude in observing precision. In parallel, great progress has also been made in the theories of motion of celestial bodies and more rigorous treatments within the frame of general relativity become necessary. The definition of reference frames and of various coordinate times become also a major problem in the intercomparison of observations produced by different methods.

This Symposium gave to people using relativistic corrections in reducing their measurements or in constructing various theories of motion a chance to exchange their experience in the field and to confront it with theoreticians in general relativity.

The Symposium was approved by the IAU in 1983 and it was organized by the Institute of Theoretical Astronomy of the USSR Academy of Sciences on May 28-31, 1985. It was sponsored by IAU Commission 7 (Celestial Mechanics) and co-sponsored by Commissions 4 (Ephemerides), 8 (Positional Astronomy), 19 (Rotation of the Earth) and 31 (Time). The USSR Academy of Sciences assisted in the organization of the meeting in the USSR.

Eight half-day sessions were devoted to the following seven topics :

- Dynamical effects in General Relativity.
- Accurate modern theories of natural bodies in the solar system.
- Reference frames and relativistic reduction of astronomical measurements.
- Relativistic effects near the Earth and Geodynamics.
- Times scales.
- Present high precision observations and relativity.
- Future observations of relativistic effects.

On the whole, 12 invited and 38 contributed papers were presented during the Symposium attended by 80 soviet and 58 non-soviet participants. Unfortunately, 10 scientists of France did not get their entry visa in the USSR and their absence seriously hampered the normal proceeding of the Symposium. For this reason, two invited and six contributed papers could not be presented. They are the following :

## Invited papers :

J. Chapront, 'Analytical planetary and lunar theories : present status and accuracies'.

C. Boucher, 'Relativistic effects in geodynamics'.

## Contributed papers :

P. Bretagnon, 'Construction of a planetary solution with the help of an N-body program and analytical complements'.

J. Laskar, 'Polynomial expansion of the planetary secular terms'.

W. Thuillot, D.T. Vu and J.E. Arlot, 'Theoretical and observational efforts in order to obtain high precision positions of the Galilean satellites of Jupiter'.

P. Teyssandier and Ph. Tournenc, 'Local measurements and cosmological background'.

J.F. Lestrade, 'A formal approach to stellar positions in solar barycentric coordinates'.

B. Guinot, 'Is the international Atomic time TAI a coordinate or a proper time?'.

In its meeting in Leningrad, the Scientific Organizing Committee has unanimously passed the following resolutions :

1. The Scientific Organizing Committee of the IAU Symposium N° 114 on Relativity in Celestial Mechanics and Astrometry, expresses its regret and draws the attention of the USSR and the French Academies of Sciences to the fact that a number of scientists, especially from France and including two scientists personally invited by the Institute of Theoretical Astronomy as guests of the Local Organizing Committee were unable to attend the Symposium because of lack of visa in time.
2. The Scientific Organizing Committee of the IAU Symposium N° 114 on Relativity in Celestial Mechanics and Astrometry, having considered the fact that a number of papers which were accepted and indeed sometimes invited by the Scientific Organizing Committee could not be presented because the authors did not get the entry visa in time, authorizes the editors of the proceedings to include this class of papers in the printed book.

The editors have requested these papers from the authors. Whenever they were not available, abstracts were included in this volume. All the papers formally presented at the Symposium are given in full (or by abstract if they are to be published elsewhere). The discussions have been summarized after some papers using the notes prepared by the authors during the sessions.

We are very grateful for the organizational and financial support of the IAU, of the USSR Academy of Sciences and of the Institute for Theoretical Astronomy in Leningrad which made this meeting possible. We also express our thanks to Mrs Fabienne COTTE, Jeanne FALIN and Monique REGNIER for their assistance in preparing the proceedings and typing of manuscripts.

The Editors, J. Kovalevsky and V.A. Brumberg.