Russian Academy of Sciences
Institute of Applied Astronomy

Celestial Mechanics–2002:
Results and Prospects

Institute of Applied Astronomy

St. Petersburg, 10–14 September, 2002

CONFERENCE PROGRAM

St. Petersburg
2002

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Dear Colleague,

You are cordially invited to take part in the international conference "Celestial Mechanics–2002: Results and Prospects".

GENERAL INRORMATION

The conference is held by the Institute of Applied Astronomy.

The conference is aimed to analyse the present state of art of celestial mechanics in anticipating new increase in the observation precision due to the future projects of space astrometry as well as to consider the prospects of further developments and coordination of research in this field.

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The conference will take place in the building of the Institute of Applied Astronomy 10–14 September, 2002.

IAA address: 10, Kutuzov quay, St. Petersburg

The Institute is located between the Lyteiny bridge (Litejnyj most) and Summer Garden (Letnij sad) at a walk distance from metro stations Chernyshevskaya and Ploshchad' Lenina.

The registration will be on 10 September (Tuesday) from 9.00 to 10.30 am.

Additive information is available by
phone: (7–812) 275 11 18 fax: (7–812) 275 11 19
http://www.ipa.nw.ru/conference/2002 e-mail: nvf@quasar.ipa.nw.ru

The preliminary CONFERENCE PROGRAM is enclosed

Prof., Dr. A. M. Finkelstein
LOC Chairman
Director of the Institute of Applied Astronomy

Celestial Mechanics–2002: Results and Prospects

Institute of Applied Astronomy
St. Petersburg, 10–14 September, 2002

Format of the Conference

10 September

09.00–10.30 Registration
10.30–11.00 Opening
11.00–13.00 Session 1

14.30–16.05 Session 2A
16.05–16.25 coffee–break
16.25–18.00 Session 2B

18.00 Informal meeting in the Institute of Applied Astronomy

11–13 September ($k = 2,\ 3,\ 4$, respectively)

09.30–11.05 Session $(2k-1)$A
11.05–11.25 coffee break
11.25–13.00 Session $(2k-1)$B

14.30–16.05 Session $(2k)$A
16.05–16.25 coffee break
16.25–18.00 Session $(2k)$B

Program of the conference

10 September

Session 1. Planetary theories

P. Bretagnon. *Analytical theories of the motion of the planets and of the rotation of the rigid Earth — 30 min*

E. M. Standish. *Present and future ephemerides: requirements and limitations — 30 min*

E. V. Pitjeva. *EPM2002 and EPM2002C — two versions of high accuracy numerical planetary ephemerides constructed for TDB and TCB time scales — 25 min*

A. Fienga. Two problems in solar systems dynamics, possible solutions and future — 25 min

Session 2A. Resonances and regularity

T. Fukushima. *New precession formula — 25 min*

N. Callegari Jr., T. A. Michtchenko, S. Ferraz-Mello. *Dynamics of resonant planets: the resonances 2:1, 3:2 and 5:2 — 25 min*

E. Lega, C. Froeschlé, M. Guzzo. *On the detection of slow diffusion along resonances in Hamiltonian systems — 20 min*

V. V. Kouprianov, I. I. Shevchenko. *The Lyapunov spectra in spin–orbit dynamics — 20 min*

Session 2B. Earth–Moon system

G. A. Krasinsky. *Selenodynamical parameters from analysis of LLR observations of 1970–2001 — 25 min*

N. Petrova, A. Gusev, K. Heki, H. Hanada, N. Kawano, and ILOM Research Group. *Physical libration of the Moon: the results and the perspectives — 25 min*

A. Gusev, N. Petrova, N. Kawano, and RISE group. *FCN–period dependence on dynamic characteristics of a lunar core — 20 min*

G. I. Eroshkin, V. V. Pashkevich. *High–precision numerical theory of the rigid Earth rotation taking into account the geodetic perturbations — 20 min*

11 September

Session 3A. Natural satellites

J.-E. Arlot. *The projects of IMCCE concerning the natural planetary satellites — 25 min*

N. V. Emelianov. *Natural satellites dynamics from observations — 25 min*

V. Lainey, A. Vienne. *Toward new ephemerides for the Galilean system — 20 min*

A. Vienne, W. Thuillot, J.-E. Arlot. *Dynamics of the Saturnian system with regard to high precision observations — 20 min*

Session 3B. Asteroids

Yu. A. Chernetenko. *Using positional observations of minor planets for improving the orientation of star catalogue — 20 min*

L. E. Bykova. *Investigation of stability of NEAs orbital resonance motions by numerical methods — 20 min*

O. M. Kochetova. *Estimation of masses of some minor planets from observations of perturbed bodies — 15 min*

T. Yu. Galushina. *The motion of asteroids at the 5:2 resonance with Jupiter — 15 min*

V. A. Shor, A. Yu. Bytsin, Yu. A. Chernetenko, O. M. Kochetova, V. D. Mikheeva, G. A. Netsvetaeva, E. Yu. Parijskaya, V. I. Skripnichenko, N. K. Sumzina, T. A. Vinogradova. *New possibilities for ephemeris support of minor planets — 15 min*

Session 4A. Earth satellites

Y. A. Abdel–Aziz, E. Wnuk. *Dynamics of artificial satellite orbits with the effects of luni–solar perturbations — 20 min*

S. M. Kudryavtsev. *An improved analytical technique for accurate calculation of satellite motion perturbations due to the Moon/Sun/planets — 20 min*

A. M. Fominov. *Earth penumbra effects on AES motion taking into account the refraction and the extinction of the light in the atmosphere — 15 min*

I. S. Gayazov. *Parameterization of the solar radiation pressure model for GPS satellites — 15 min*

M. O. Keshin. *First results of GPS orbit determination with GRAPE package using a square–root information filter — 15 min*

Session 4B. Earth–Moon space probes

V. V. Ivashkin. *Analysis of the Earth–to–Moon trajectories of new type with the temporary capture of a particle by the Moon — 20 min*

N. S. Kardashev, B. B. Kreisman and Yu. N. Ponomarev. *High orbit for the RadioAstron project — 20 min*

B. B. Kreisman. *Families of periodic solutions of the planar restricted three–body problem and their application at designing the orbit for the space radio telescope — 20 min*

12 September

Session 5A. Comets

A. I. Neishtadt, D. Scheeres, V. V. Sidorenko, A. A. Vasiliev. *Analytical constraints on comet nucleus rotation — 20 min*

Yu. D. Medvedev. *On figure of a sublimating cometary nucleus — 20 min*

M. D. Zamarashkina, Yu. D. Medvedev. *Estimate of P/Shoemaker–Levy nucleus size — 15 min*

O. F. Grigoryan, Yu. D. Medvedev. *On non–gravitational acceleration in Harrington–Abell comet motion due to Jupiter — 15 min*

Session 5B. Perturbation theory I

M. A. Vashkov'yak. *On the development of M. L. Lidov's techniques on the evolution of satellite orbits — 20 min*

V. I. Prokhorenko. *Geometrical analysis of solutions of restricted three–body problem — 15 min*

Yu. V. Batrakov. *Orbits with osculation of higher orders and their use in celestial mechanics — 20 min*

V. A. Shefer. *Superosculating intermediate orbits and their applications to study the perturbed motion — 15 min*

F. Deleflie, G. Métris, P. Exertier. *An analytical solution of Lagrange planetary equations valid also for very low eccentricities — 15 min*

Session 6A. Posters I (5 min for each poster; see list Posters–I)

Session 6B. Posters II (5 min for each poster; see list Posters-II)

13 September

Session 7A. Perturbation theory II

T. V. Bordovitsyna, V. A. Avdushev, A. M. Chernitsov. *Two trends in the development of numerical algorithms of celestial mechanics — 20 min*

V. A. Avdyushev. *Numerical stabilization of orbital motion — 15 min*

V. V. Beletsky, M. L. Pivovarov, A. A. Savchenko. *Regular and chaotic relative motion of a dumb–bell–shaped satellite — 20 min*

K. V. Kholshevnikov. *Precision increase for the theory of relative motion of a satellite's pair — 15 min*

V. V. Emel'yanenko. *Symplectic integrators for studying the long–term evolution of high–eccentricity orbits — 15 min*

Session 7B. Extra–Solar systems

D. Benest. *Regularity and chaos for planetary orbits in binaries — 20 min*

B. R. Mushailov, A. A. Kaloshin. *Dynamic evolution of resonance orbits of exoplanets in system 47 Uma — 20 min*

L. L. Sokolov. *On the orbits of extrasolar planets — 20 min*

Session 8A. GRT & Discussion

A. Milani. *Celestial Mechanics and the real Solar System: measurements, models and tests — 30 min*

V. A. Brumberg. *Relativistic celestial mechanics–2002: results and prospects — 25 min*

Yu. V. Baryshev. *Generalized Nordtvedt effect and tests of equivalence principle for rotating bodies — 15 min*

General discussion

Session 8B. Discussion & Closing

Posters–I

Celestial mechanics for general astronomy

A. P. Baturin. *An approximate projection of confidence ellipsoids of space objects positions onto the celestial sphere*

A. Gusev, I. Kitiashvili. *Precession and free core nutation of neutron stars*

M. V. Lukashova, L. I. Rumjantseva. *Canon of solar eclipses in Russia for the interval 1000–2050*

B. R. Mushailov, A. A. Kaloshin. *Preliminary results of search studies of predicted hypothetical objects beyond the orbit of Jupiter*

Internet and computer techniques

N. Baron, J.-E. Arlot. *The ephemerides server of the Institut de mécanique céleste et de calcul des éphémérides*

N. V. Batkhina, A. B. Batkhin. *High precision parallel algorithms of numerical integration of celestial mechanics problems*

V. S. Ural'skaya, N. V. Emelianov. *Celestial Mechanics in Internet — Russian web–site*

Earth satellites and the Earth

E. Yu. Aleshkina. *Determination of UT0 from lunar laser ranging data analysis*

T. V. Ivanova, N. V. Shuygina. *Analysis of SLR observations of the Etalon geodetic satellites*

V. Koblik, E. Polyakhova. *Solar sails as space–based screens against Earth's climatic warming*

G. A. Krasinsky. *Duirnal pole tides and determination of static and dynamic Love numbers from analysis of VLBI observations 1998–2001*

M. S. Petrovskaya, A. N. Vershkov. *High–accuracy modelling of the Earth's gravitational potential from GOCE satellite gradiometry mission*

M. V. Vasiliev, E. I. Yagudina. *Station coordinates from observations of DORIS system TOPEX/Poseidon satellite*

Posters–II

Natural satellites

T. P. Kiseleva, I. S. Izmailov, M. A. Mozhaev. *CCD observations of planetary satellites and occultations and close approachments of stars by asteroids with 26-inch refractor of Pulkovo observatory*

A. Lopez Garcia, J. A. Morano Fernandez, A. F. Martinez, E. Yagudina. *The major planets satellite observations with CCD techniques*

A. V. Melnikov. *Modelling of lightcurves of minor planetary satellites*

Asteroids

S. I. Ipatov. *Formation and migration of trans–Neptunian objects*

S. I. Ipatov. *Migration of asteroids from the 3/1 and 5/2 resonances with Jupiter to the Earth*

T. A. Vinogradova. *Visible motion of minor planets*

Comets

A. S. Solov'ev. *To a problem of perturbed motion of comets*

Perturbation theory

Yu. V. Barkin. *Rotation theory of celestial bodies: dynamical relations of the pole motion and nutation*

L. E. Bykova, V. P. Titarenko. *Solution stabilization algorithms for the estimation of small bodies orbital parameters*

E. D. Kuznetsov, K. V. Kholshevnikov, A. V. Greb. *Expansion of the Hamiltonian of the planetary three–body problem into Poisson series in all elements using Poisson series processor PSP*

V. G. Sokolov. *On convergence domains of expansions of disturbing function of the planetary three–body problem in powers of eccentricities*

N. Yu. Saburova. *Comparison of conditionally periodic solutions with the results of numerical integration in the two rigid body problem*

A. S. Zimovschikov, N. N. Titova, V. N. Tkhai. *Periodic orbits in photogravitational three–body problem*

Determination of orbits

V. B. Kuznetsov. *Determination of rectilinear orbits*

V. A. Shefer. *Determination of preliminary orbits including perturbations*

P. Descamps. *Connection between apparent and real orbits of a binary system*

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