

KTM ASTROMICAL INSTITUTE OF THE HUNGARIAN ACADEMY OF SCIENCES

KONKOLY OBSERVATORY

Location: 1121 Budapest, Konkoly Thege út 15-17, Postal address: 1525 Budapest, Pf. 67

Phone: 3955 866, 3754 122 Fax: 2754 668

E-mail: balazs@konkoly.hu WWW: <http://www.konkoly.hu>

HELIOPHYSICAL OBSERVATORY

Location: Debrecen, KLTE, Botanikus kert, Postal address: 4010 Debrecen, Pf. 30

Phone: (52) 311 015

Email: ludmany@tigris.klte.hu WWW: <http://fenyi.sci.klte.hu>

SCIENTIFIC STAFF:

Space research group

Almár Iván (PI)

Horváth András

Illés Erzsébet

Kelemen János

Tóth Imre

ISO/Herschel project (ESA)

Balázs Lajos (PI)

Ábrahám Péter

Csizmadia Szilárd

Kiss Csaba

Moór Attila

Tóth L. Viktor

COROT project (ESA)

Paparó Margit (PI)

Benkő József

Bognár Zsófia

Csubry Zoltán

Kolláth Zoltán

Sárnecky Krisztián

Szabados László

Solar physics group

Ludmány

András (PI)

Baranyi Tünde

Győri Lajos

Kálmán Béla

Kovács Ágnes

Mező György

Muraközy Judit

SCIENTIFIC ACTIVITIES AND RESULTS

1. Upper Atmospheric Research

(in cooperation with the Geodetic and Geophysical Research Institute of the HAS)

On the basis of the revaluation of old optical observations of many artificial satellites, carried out from whole Eurasia between 1960 and 75, the existence of a North-South asymmetry in the model residuals (CIRA'86 and E00MSIS) has been demonstrated in the upper atmospheric density between 250-500 km and $\pm 60^\circ$ geographic latitudes. The model residuals are decreasing continuously from $+60^\circ$ to -60° degrees. The Equator has no significant position, and there is no annual trend. Our results have been presented in Paris at the 35th congress of COSPAR and also together with an attempt of interpretation at the EGU 2005 Congress in Vienna.

Two other posters have been also presented on the EGU 2005 congress on our new results concerning 1./ the giant solitary waves in the thermosphere and 2./ the sudden increases in the amplitude of the total neutral density fluctuations. Both phenomena have been discovered by us.

We continued to investigate the fine structure phenomena in the neutral density – ionosphere interaction based on *in situ* satellite observations.

2. Solar-Terrestrial Relations

Two kinds of asymmetries have been analysed in the study of geoeffective solar plasma streams. The first is of North-South type which is the consequence of the coronal mass ejection magnetic topologies, while the second is of East-West type which concerns the cases of different senses of the By component in these plasma streams. These components have different impacts on the ionospheric currents in the polar region. Spectroscopic investigations have been carried out on the Debrecen spectrograph concerning the behaviour of the MnI 539,47 nm line in the photosphere, chromospheric faculae and sunspots, this line is a promising indicator of the irradiance variations.

3. Planetary Studies

The Stardust observations on the nucleus of Comet Wild 2 provided further evidence to our previous hypothesis that cometary nuclei may be built up from sub-nuclei of different hardness. Our results have been presented as a poster at the 35th congress of COSPAR in Paris. (*E. Illés-Almár: "Comet Wild 2 and the two kinds of cometary subnuclei-population"*).

Based on recent Cassini measurements it can be considered proven that Saturn – contrary to the other giant planets – has two ring systems of independent origin. The dust rings come into existence similarly to those of other giant planets, but the ice ring system (the B+A ring) takes its origin by fragmentation of a giant cometary nucleus. The fragmentation and the dispersion started to happen where the B ring is the brightest on the lit side, darkest and coldest on the unlit side. The disintegration and the spreading are continuing even today demonstrated by the uneven brightness, opaqueness and dirtiness of the B+A ring. At the distance of the disintegration the ice ring system can be many-particles-thick, but near the edges of monolayer type. Therefore, it is supposed that a single component model cannot describe the Saturnian ring system neither in composition nor in layer type. It has been presented as poster on the EGU 2005 congress in Vienna and submitted to a Special Issue of *Planetary and Space Sciences*.

Observations, data analysis and interpretation, as well as the publication of the results taken place in the frame of a Hungarian – French (MTA (HAS) -- CNRS) bilateral scientific cooperation.

Deep Impact. We performed supporting joint observations for the Deep Impact, the eighth mission in NASA's Discovery Program. The nucleus of the target comet 9P/Tempel 1 was observed with the High Resolution Channel (HRC) of the Advanced Camera for Surveys

(ACS) of the Hubble Space Telescope (HST) in the frame of GO 10115 project, "Rotation of comet Tempel 1", during Cycle 13 of the HST between 7 and 9 May in 2005. From the HST ACS/HRC observations we obtained a complete precise V-band lightcurve of the nucleus and derived the size and rotational period.. From the HST ACS/HRC observations the rotational period of the nucleus is 41.27 ± 1.85 hr merging the all selected ground-based lightcurve observations together.

Rosetta. In February of 2004 we observed the comet 67P/Churyumov--Gerasimenko (67P), the target of the Rosetta, the in-situ comet mission of ESA, at 24-micron in the thermal infrared with the Multi-band Imaging Photometer for Spitzer (MIPS) of the NASA Spitzer Space Telescope. The observations were performed during the Cycle 1 of the SST in the frame of No. 222 DDT program: "Measuring the size and shape of comet 67P/Churyumov--Gerasimenko, the target of the Rosetta mission" (PI is Philippe Lamy, CNRS, France). The nucleus is successfully detected and the 24-micron thermal infrared lightcurve is observed. with the HST observations the rotational period is 41.85 ± 0.20 hr.

BepiColombo. We contributed to the BepiColombo, the in-situ Mercury project of the ESA, in the calculation of the thermal infrared flux of the planet. It was a short-term temporary collaboration with CNRS and CNES.

Space telescope exploration of the ecliptic comets. We continued the data analysis, interpretation, and publishing the results of the HST, ISO, and Spitzer observations of the ecliptic comets. We observed thirteen cometary nuclei during the Cycle 8 of the HST and other ten during the Cycle 9 (beside comet 73P/SW3) We have unique precise photometric results on the nucleus of the ecliptic comets (for example sizes, colors): we have now altogether 32 ecliptic comet nuclei, which are observed with the HST, sometimes additionally with ISO and SST.

Investigation of the Martian dark dune spots (DDSs). We continued the investigation of the Dark Dune Spots (DDSs) of polar dunes on Mars. The DDS-MSO hypothesis was supported by the latest results from the analysis of MGS MOC and MO THEMIS images. Elongated slope structures were analysed that emanate from Dark Dune Spots on slopes with inclination greater than 8-11 degrees. The connection between their geometric properties, the "pond-like" structures at their end, their connection with the local topography and seasonal phase, and the "ghost" images left behind suggest that the best explanation for them is the ephemeral liquid water runoff under frost cover. These findings coincide with the predictions of the DDS-MSO model, where greenhouse warming produces liquid water under the frost cover.

Based on the images, Dark Dunes seem to catch the water ice from the atmosphere first in autumn and keep the frost cover for the longest period. This suggests that the special microphysical environment on the dunes can trap much H₂O and we predict that H₂O ice frozen onto dunes may reach thickness on the order of millimetres.

The original DDS-MSO hypothesis was developed further regarding the UV-protection and the internal structure of the possible shielding layers. Based on theoretical considerations and some earthly analogues we suggest the following structure: 1. CO₂ and/or clathrate

snow/ice, 2. H₂O ice, 3. liquid H₂O, 4. dead cells and UV protecting organic layer, 5. living cells. Small quantity of sand also can be mixed with the 4th and 5th layer, providing higher UV protection, while let the light to penetrate into several mm depth.

4. Space-Related Solar Research

Comparative studies have been made between the Debrecen Photoheliographic Data and other sunspot catalogues as well as the SOHO/MDI data. Developments have been achieved in the evaluation and presentation of DPD. Statistical studies have been carried out concerning the East-West asymmetry of the sunspot areas, as well as about the spatial and temporal correlation of the solar torsional wave and different sunspot parameters. The intrusion of the emerging flux into the corona and its interaction with the existing magnetic field has been studied in TRACE coronal observations.

Exchange of data and observations: NOAA World Data Center (Boulder), SOHO/MDI team (Stanford), 12 solar observatories (Abastumani, Ebro, Helwan, Kanzelhöhe, Kiev, Kislovodsk, Kodaikanal, Mount Wilson, Rome, Tashkent, Tokyo, Valasske Mezirici) Common papers: Jet Propulsion Laboratory (Pasadena), Goddard Earth Sciences and Technology Center - UMBC (Greenbelt), Astronomical Observatory (Belgrade), Main Astronomical Observatory (Kyiv)

5. Pre-selection process of targets on COROT

The main task in 2004 was the preparation of joining the COROT space project in the frame of ESA PECS project. The "Pre-selection process of targets on COROT" ESA PECS project started from January of 2005 and will be ended in 2009. The Hungarian Asteroseismology Group (HAG, <http://www.konkoly.hu/HAG>) was established early in 2005.

We obtained time series CCD photometry for two main seismo targets (HD 181555 and HD 44195) and some of the secondary targets on these fields as part of the joint effort on the photometric characterization of targets.

Variability search was carried out for 11 exoplanet fields. Beside the photometry of more than 2000 stars, two low amplitude variable stars and a probably cataclismic variable star were discovered. Further photometric characterization of these stars are in progress. A softver was improved for the automatic investigation of large databases. The algorithm can be used for the selection of variable and non-variable stars based only on the light curves obtained on COROT. We have used it for 20000 stars of the ROTSE-I database. 385 stars were found to be variable in the 10 degree winter field of COROT eye.

6. ISO/Herschel calibration project

In the framework of the collaboration between the ISO Data Centre and Konkoly

Observatory, in 2005 we have created three photometric catalogues containing re-calibrated infrared data obtained by ISOPHOT, the photometer on-board ESA's Infrared Space Observatory. The catalogues have been ingested into the ISO Data Archive and are available for the public. Two catalogues are based on far-infrared observations of compact astronomical sources measured with the ISOPHOT at wavelengths longwards of 60 micrometer, while the third data set contains compact objects observed at near-infrared wavelengths.

Konkoly Observatory is actively contributing to the preparation of ESA's Herschel Space Observatory. One of our tasks is to develop a tool offered to observers to estimate the level of sky confusion. The prototype of the Herschel Confusion Noise Estimator modul has been developed, passed the necessary tests, and will be built into the HSPOT observation design environment. An important aspect of sky confusion in the infrared is the contribution of asteroids. We developed a model including ~2million asteroids, which allows the determination of spatial position and infrared spectrum of the asteroids at a specific date, as well as the asteroid confusion noise and expected number density of asteroids for a specific measurement configuration. This model is now a main component of the Herschel Confusion Noise Estimator. We also contributed to the calibration and evaluation of ground based test data of the PACS instrument (Photoconductor Array Camera and Spectrometer) onboard Herschel, by analysing test data and compiling test reports.

Our growing database of infrared photometric observations of young stellar objects (mainly obtained by the ISO, IRAS and Spitzer satellites) gives now the opportunity to investigate temporal brightness variations at infrared wavelengths. Such kind of infrared variability studies are still novelties in the literature, but can efficiently constrain models of the circumstellar environment, especially when the measurements are directly compared with predictions of radiative transfer computations. We analysed the fading of the eruptive young star OO Serpentis using multiepoch datasets obtained by the Infrared Space Observatory. The data revealed that the star returned to its pre-outburst state by 2005, and this ~10 years of outburst length is unique among eruptive young stars. We also found that the fading rate was fastest at mid-infrared wavelengths, possibly indicating the presence of a hot inner rim of the circumstellar disk.

Publications

1. Ábrahám, P., Kiss, Cs., Kóspál, Á., Csizmadia, Sz., Moór, A., Juhász, A., 2005, "Analyses of the ISO/ISOPHOT database in preparation to the Herschel mission", Proc. of *The dusty and molecular universe: a prelude to Herschel and ALMA*, 2005, ESA SP-577, p. 477
2. Baranyi, T., Ludmány, A.: 2005, „Geoeffective and climate-influencing solar and interplanetary conditions”, *Hvar Obs. Bull.*, **29**, 251-260.

3. Baranyi, T., Ludmány, A.: 2005, „Symmetric or asymmetric energy transfer from Interplanetary Coronal Mass Ejections to the magnetosphere depending on the solar dipole”, *Adv. Space Res.*, **35**, 421-425.
4. Belton, M.J.S., Meech, K.J., A'Hearn, M.F., Groussin, O., McFadden, L., Lisse, C., Fernández, Y.R., Pittichová, J., Hsieh, H., Kissel, J., Klaasen, K., Lamy, P., Prialnik, D., Sunshine, J., Thomas, P., Tóth, I., 2005. “Deep Impact: Working properties for the target nucleus-comet 9P/Tempel 1”. *Space Sci. Rev.*, **117**, 137-160.
5. Belton, M.J.S., Meech, K.J., A'Hearn, M.F., Groussin, O., McFadden, L., Lisse, C., Fernández, Y.R., Pittichová, J., Hsieh, H., Kissel, J., Klaasen, K., Lamy, P., Prialnik, D., Sunshine, J., Thomas, P., Tóth, I., 2005, „Deep Impact: Working properties for the target nucleus-comet 9P/Tempel 1”, in *Deep Impact Mission: Looking beneath the surface of a cometary nucleus*, (Ed.: C.T. Russell), Springer, Dordrecht, The Netherlands, pp. 137-160.
6. Dijkstra, C., Speck, A.K., Reid, R.B., Ábrahám, P., 2005, "The 10 m Feature of M-Type Stars in the Large Magellanic Cloud and the Dust Condensation Sequence", *Astrophysical Journal* **633**, L133
7. Groussin, O., Lamy, P., Jorda, L., Toth, I., 2004, „The nuclei of comets 126P/IRAS and 103P/Hartley 2.”, *Astron. Astrophys.* **419**, 375-383.
8. Győri, L., Baranyi, T., Ludmány, A., Gerlei, O., Csepura, G., Mező, G.: 2004, Debrecen Photoheliographic Data for 1993-95, Publ. Debrecen Obs. Heliogr. Series, 17-19, 1-85
9. Győri, L., Baranyi, T., Turmon, M., Pap, J.M.: 2004, “Study of differences between sunspot area data determined from ground-based and space-borne observations”, *Adv. Space Res.*, **34**, 269-273.
10. Győri, L., Baranyi, T., Muraközy, J., Ludmány, A.: 2005, „Comparison of sunspot area data determined from ground-based and space-borne observation”, *Mem. S.A.It.*, **76**, 985.
11. Győri, L., Baranyi, T., Muraközy, J., Ludmány, A.: 2005, „Recent advances in the Debrecen sunspot catalogues”, *Mem. S.A.It.*, **76**, 981.
12. Győri, L.: 2005, „Automated determination of the alignment of solar Images”, *Hvar Obs. Bull.*, **29**, 299-308.
13. Kiss, Cs., Klaas, U., Lemke, D., 2005, "Determination of confusion noise for far-infrared measurements", *Astronomy and Astrophysics* **430**, p. 343
14. Lamy, P., Toth, I., Fernandez, Y.R., Weaver, H.A., 2004. „The sizes, shapes, albedos and colors of cometary nuclei”. Proc. of *Comets II*, (M. Festou, H.U. Keller, and H.A. Weaver, Eds.), Space Science Series Book. University of Arizona Press, Tucson, Arizona, pp. 223-264.
15. Lisse, C.M., Groussin, O., A'Hearn, M.F., Weaver, H.A., Lamy, P., Meech, K.J., Belton, M.J.S., Fernandez, Y.R., Toth, I., 2004., „Rotational properties of Deep Impact target comet 9P/Tempel 1.” 35th COSPAR Scientific Assembly. Held 18-25 July 2004, in Paris, France, p. 3161.
16. Mező, G., Baranyi, T., Muraközy, J., Győri, L.: 2004, Statistical study of the East-West asymmetry of sunspots, in: Proc. IAU Symposium No.223 "Multi-Wavelength Investigations of

Solar Activity", eds: A. V. Stepanov, E. E. Benevolenskaya, and A. G. Kosovichev, Cambridge, UK: Cambridge University Press, 285-286.

17. Mező, G., Baranyi, T., Győri, L. : 2005, „Debrecen Photoheliographic Data and its comparison with other sunspot databases, in: Solar Magnetic Phenomena”, in Proc. "Solar Magnetic Phenomena" eds.: A. Hanslmeier, A. Veronig and M. Messerotti, *Astrophys. Space Sci. Library*, **320**, 247-250.
18. Mező, G., Baranyi, T.: 2005, „HTML presentation of the Debrecen Photoheliographic Data sunspot catalogue”, *Mem. S.A.It.*, **76**, 1004
19. Mező, G., Muraközy, J., Baranyi, T., Győri, L. : 2005, „East-West asymmetry on the solar disk”, *Hvar Obs. Bull.*, **29**, 99-107.
20. Muraközy, J., Mező, G., Ludmány, A., Győri, L.: 2005, „Search for possible connections of sunspot features and torsional waves”, *Hvar Obs. Bull.*, **29**, 31-37.
21. Müller, T.G., Ábrahám, P., Crovisier, J., 2005, "Comets, Asteroids and Zodiacal Light as Seen by ISO", 2005, Space Science Reviews, **119**, p. 141
22. Paparo, M. 2004, „Future status of single sites in astroseismology”, ESA SP-538, p. 381
23. Pócs, T., Horváth, A., Gánti, T., Bérczi, Sz., Szathmáry, E. (2004) Possible Crypto-Biotic-Crust on Mars? Proc. of the III. European Workshop on Exo-Astrobiology. Mars: The search for Life, Spain, 18-20 November 2003, *ESA SP-545*, March 2004, pp. 265-266
24. Tóth, I., Lamy, P.L., Weaver, H.A., 2005. „Hubble Space Telescope observations of the nucleus fragment 73P/Schwassmann-Wachmann 3-C”, *Icarus*, **178**, 235-247.
25. Toth, L., Gerlei, Q.: 2004, “On the dynamic disconnection of rising omega loops”, *Solar Phys.*, **220**, 43-59.
26. Vince I., Vince O., Ludmány, A., Andriyenko O.: 2005, „The Mn I 539.47 nm line variation in solar active regions”, *Solar Physics*, **229**, 273-285.

Talks, posters

1. Almár I., 2005: „Space Exploration and 'Protection of the Environment' Issues” oral presentation at the 5. EANA meeting, Budapest
2. Almár I., 2005, „Terminology: a Bridge Between Space and Society”, IAA talk at the conference “Impact of Space on Society” IAA (Budapest, 2005. March)
3. Almár, I., 2005, „The Impact of Space on Society”, talk at the workshop „Space and the Arts”
4. Bencze, P, Almár, I , Illés-Almár, E: „North-South Asymmetry in the Thermosphere and Ionosphere”, Geophysical Research Abstracts Vol. 7.03078, 2005. SRef-ID:1607-7962/gra/EGU05-A-03078
5. Bencze, P., Almár, I., Illés-Almár, E.: “Study of the Abrupt Amplitude Increase of Total Neutral Density Fluctuations with Height in the Thermosphere” Geophysical Research Abstracts Vol. 7. 03093, 2005. SRef-ID: 1607-7962/gra/EGU05-A-03093

6. Benkő J., Csubry Z.: „ROTSE-I all sky survey as a tool of target selection in the COROT fields” (poster presentation on the 8th COROT week, <http://smc.cnes.fr>)
7. Bérczi, Sz., A. Kereszturi, Á., Horváth A. (2004) Stratigraphy of Special Layers – Transient ones on Permeable ones: Examples from Earth and Mars. *Lunar Planet. Sci.* XXXV, #1317, Houston, CD-ROM and poster
8. Bérczi Sz., Horváth A., Nagy B., Kereszturi Á., Sik A., Pócs T., Gesztesi A., Gánti T., Szathmáry E. (2005): Comparisons of Martian Flow-Streaks with DDS Origin and their Probable Counterparts on Antarctica. *29th NIPR Symposium Antarctic Meteorites*, Tokyo, jún. 6–9., p.3, oral presentation
9. Csubry Z., Kolláth Z.: „MuFrAn, a scriptable data processing tool for variable stars” (poster on the 8th COROT week, <http://smc.cnes.fr>)
10. Horváth, A., Pócs, T., Gánti, T., Bérczi, Sz., Szathmáry, E. (2004) “On the Possibility of a Cryptobiotic-Crust on Mars Based on Northern and Southern Ringed Polar Dune Spots”. *Lunar Planet. Sci.* XXXV, #1914, Houston, CD-ROM and poster
11. Horváth, A., Gánti, T., Pócs, T., Bérczi, Sz., Schweitzer, F. Szathmáry, E. (2004) “Terrestrial analogues for possible Martian surface life forms: CBC, desert varnish, cryoconites”, *35th COSPAR*, F3.5/B0.11-0009-04, 18–25 July 2004, Paris; *Advances in Space Research* (assigned, manuscript number: JASR-D-04-00766)
12. Horváth, A., Bérczi, Sz., Kereszturi, Á., Pócs, T., Gesztesi, A., Gánti, T., Szathmáry, E. (2004) “Annual change of outflows from Dark Dune Spots in the Southern Polar Region of the Mars”, *IV. European Workshop on Exo-Astrobiology (EANA)*, Life in Extreme Environments, Great Britain, 22-25 November 2004, Abstract book. 91, poster
13. Horváth, A. Kereszturi, Á. Bérczi, Sz., Sik, A., Pócs, T., Gesztesi, A., Gánti, T., Szathmáry, E. (2005): Annual change of Martian DDS-seepages. #1128, *Lunar and Planetary Conference*, Houston, márc. 14–28., poster presentation
14. Illés-Almár, E., Almár, I. Bencze, P: „Solitary, Giant Density-waves in the Thermosphere”. *Geophysical Research Abstracts* Vol. 7. 05114, 2005. SRef-ID: 1607-7962/gra/EGU05-A-05114
15. Illés-Almár, E.: „On the Origin of the Two Saturnian Ring Systems” *Geophysical Research Abstracts* Vol. 7. 05076, 2005. SRef-ID: 1607-7962/gra/EGU05-A-05076
16. Illés-Almár, E. “On the Origin of the Dark Material on Iapetus”, *Geophysical Research Abstracts* Vol. 7. 05055, 2005. SRef-ID: 1607-7962/gra/EGU05-A-05055
17. Lamy, P.L., Jorda, L., Toth, I., Weaver, H.A., Cruikshank, D., Fernandez, Y., 2004. „Visible and thermal infrared observations of the nucleus of comet 67P/Churyumov-Gerasimenko.” *35th COSPAR Scientific Assembly*. Held 18-25 July 2004, in Paris, France, p. 1824.
18. Lamy, P.L., Tóth, I., A'Hearn, M.F., Weaver, H.A., 2005. “The rotational state of the nucleus of comet 9P/Tempel 1.” *DPS 37th*, 4-9 September 2005, Cambridge, UK, [P44.11].
19. Lisse, C.M., A'Hearn, M.F., Belton, M.J.S., Fernandez, Y.R., Groussin, O., Lamy, P., Meech, K.J., Toth, I., Weaver, H.A., 2004. „Physical properties of the Deep Impact target 9P/Tempel 1 from Spitzer and Hubble Space Telescope observations.” *Bull. Amer. Astr. Soc.* **36**, 1148
20. Paparo M.: „Hungarian participation in COROT” (talk on the 8th COROT week, <http://smc.cnes.fr>)

21. Pócs, T., Szathmáry, E., Bérczi, Sz., Horváth, A., Gánti, T., Kereszturi, Á (2004) Cryptobiotic crust types, as earthy analogues of possible Martian life forms, *IV. European Workshop on Exo-Astrobiology (EANA)*, Life in Extreme Environments, Great Britain, 22-25 November 2004, Abstract book, p. 18
22. Pócs, T., Szathmáry E., Horváth A., Nagy B., Sik A., Bérczi Sz., Gánti T., Kereszturi Á. (2005): Extremophile cryptobiotic communities in cold and hot deserts. *5th EANA Workshop*, Budapest, Oct. 12.
23. Szathmáry E., Horváth A., Sik A. Bérczi Sz., Gánti T., Pócs, T., Kereszturi Á. (2005): Signs of water runoff and its relation to possible living organisms on Mars. *5th EANA Workshop*, Budapest, Oct. 12, talk
24. Szathmáry, E., Horváth A., Bérczi Sz., Kereszturi Á., Pócs, T., Gesztesi A., Gánti T., Sik A. (2005): Candidates for Organisms on Mars on the basis of DDS, CBC, Desert varnish and cryoconite studies. *1. Mars Express Science Conference*, ESTEC, Noordwijk, (21-25 February 2005), poster presentation
25. Tóth, I., 2005. Connections between asteroids and cometary nuclei (Invited review talk), IAU Symposium No. 229: Asteroids, Comets, Meteors 2005 (ACM 2005), Rio de Janeiro, Búzios, Brazil, 7-12 August 2005

ISOPHOT fotometric atalogues

1. Catalogue of far-infrared ISOPHOT observations of compact objects in nodding and scan mode
2. Far-infrared mini-maps of extragalactic objects
3. Catalogue of ISOPHOT observations of compact sources at 3.6 micrometer

Herschel/PACS kalibrációs reports

1. Investigation of the cooler recycling procedure of the PACS Bolometer Focal Plane Unit
2. Comparison of nominal and PACS/SPIRE parallel mode cooler recycling procedures
3. Determination of the dynamic range for the Cryogenic Readout Electronics
4. Determination of the emissivity of the internal calibration source
5. Evaluation of the test data of the frequency switching astronomical template.