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1.1 Dissemination Level

| Dissemination Level | | |
|---------------------|---|---|
| PU | Public | X |
| PP | Restricted to other programme participants (including the Commission Services) | |
| RE | Restricted to a group specified by the consortium (including the Commission Services) | |
| CO | Confidential, only for members of the consortium (including the Commission Services) | |

1.2 Content

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2. Report

The Young European Astronomers' Conference – YERAC - has been held annually since 1968. The primary goal of the conference is to provide participants - both scientists and engineers - masters and doctoral students, as well as early-career postdoctoral researchers - the opportunity to present their research, typically for the first time. YERAC covers all aspects of radio astronomy.

The Young European Radio Astronomers Conference'2015 was held in Ventspils, Latvia from 19-21 of August 2015. This year YERAC was organised by RadioNet and Ventspils University College (VUC). There were 35 participants taking place in this annual event. The scientific part was accompanied additionally by an excursion to Ventspils International Radio Astronomy centre telescope complex in Irbene. This was combined with the final celebration of 32m antenna reconstruction attended by the EVN Chair (R. Vermeulen), rector of VUC, and representatives from Latvian Ministry of Education and Research.

<http://yerac2015.venta.lv/>

2.1 Scientific Summary

The scientific programme of YERAC'2015 consisted of 33 contributed and 2 invited talks, distributed over three days and seven sessions each focusing on a different topic in radio astronomy.

The first invited speaker Z. Paragi (Fig. 1) talked about the development of JIVE, EVN, and e-VLBI in context with the purpose of these institutions, and major scientific, and methodical advances in the field of very large base radio interferometry observations.



Zsolt Paragi introduces the first scientific talk of the conference.

Main announced results in Session 1 “Stars” included detection of magnetic field properties above large isolated sunspots (D. Bezrukovs) and the discovery of 17 and 2 new pulsars with the help of the ongoing High Time Resolution Universe (M. Berezina) and Nancay SPAN512 (F. Octau) surveys, respectively. A preliminary finding that the space velocity of pulsars is directed along the axis of their rotation was reported by E. Nikitina. Y. Metodieva reported the progress of a brown-dwarf flare monitoring with the Jansky Very Large Array (VLA), while A. Skoryk concluded that studies of the fine structure decametric radiation from near pulsars is an important instrument for investigation of the interstellar propagation medium.

Observations of mainly carbon-chain molecules in the envelope of the asymptotic giant branch star IRC+10216 were presented by D. Keller in Session 2 (interstellar and circumstellar medium). Other talks focused on star-forming regions. E. Garcia-Garcia presented IRAM 30m and *Herschel* telescope observations of methanol in the prestellar core L1689B, in context with other chemical species and important physical processes. This was complemented by a theoretical study by J. Kalvāns. He concluded that, molecule ejection from interstellar ices by the exothermic H+H surface reaction is a desorption mechanism, whose possible importance in such dark cores has probably been significantly underestimated (Kalvāns 2015). J. Pericaud showed the analysis of new observations of a warped transitional gas-debris disk around the young Herbig Ae/Be star HD141569A with the Plateau de Bure Interferometer.

The topic of the final session in Day 1 was Galaxies. The derivation of gas mass, inclination and other properties of (ultra) luminous infra-red galaxies from molecular gas observations with IRAM 30m was discussed by R. Herrero-Illana. A. Ponomareva presented the use of the Tully-Fischer relation as a tool to investigate the properties of highly inclined ($>45^\circ$) spiral galaxies. In a less-well researched area, in a LOFAR study of spiral galaxies by S. S. Sarvesh it was preliminary found that low frequency observations reveal magnetic fields in the outer galactic disks, although imaging challenges still exist.

Day 2 begun with the second invited talk by I. Zinchenko about (sub)mm wave astronomy. The speaker briefly discussed observations and structure of molecular clouds, star-forming regions, diffuse interstellar gas, external (active) galaxies, and the cosmic microwave background. He also provided a short description of major existing and planned sub-millimetre radio telescopes and arrays – IRAM 30m, JCMT, 50m LMT, APEX, ALMA, NOEMA, EHT, *Herschel*, SOFIA, SPICA, Millimetron.

The day was continued with Session 4 “Active galactic nuclei”. M. Brienza discussed the life cycle of AGNs in context with recent LOFAR observations of AGN remnants and restarted jets (Brienza et al. 2015). Kim K. S. presented initial results from VLA and ATCA observations of 49 quasars as probes of intervening intergalactic matter containing Mg II absorption lines. VLBA polarimetry studies of the blazar Markarian 421, presented by R. Lico, revealed that the magnetic field is perpendicular to the jet in blazar’s core region (likely affected by a transverse shock) and parallel to the jet outside the galaxy (Lico et al. 2014). In a 3 mm wavelength radio survey, conducted with the Global MM-VLBI Array, series of AGN maps were produced (D. G. Nair and coworkers). The results indicate that the AGN jets are adiabatic and decelerating.

The talks in the next session of the conference, “Galaxy clusters”, largely focused on intergalactic structures. The subtraction of strong sources in LOFAR maps of the merging galaxy cluster Abell 1682 reveal an ultra-steep spectrum radio halo, largest of its kind (A. Clarke). In context with observations in other wavelengths, it was confirmed that the halo has formed by a re-acceleration mechanism. Radio relics were the objects for studies by C. Dumba and K. Rajpurohit. The former discussed observations in several wavelength ranges of radio relic in the merging galaxy cluster Abell 115, while the latter discussed a possible radio relic observed with WSRT in the cluster CIZA J0649.3+1801, concluding that it has a steep

spectrum and shows evidence of polarization. In a slightly different field, G. Kokotanekov presented results of LOFAR Multifrequency Snapshot Sky Survey on the influence of AGNs on the evolution of galaxy clusters as the jets clear the intracluster gas. He confirmed the relation between cavity power and radio luminosity of the AGN.

Session 6 “Cosmic masers” began with methanol maser observations program presented by the recently started PhD student A. Aberfelds. This is planned to be carried out in cooperation with the Toruń Centre for Astronomy and complements the work on methanol masers presented by the three young researchers from Toruń. M. Dziełak and R. Sarnak had identified promising candidates for water and methanol maser detection using the Toruń Methanol Source Catalogue and eVLA archival data, respectively. M. Olech presented preliminary results of a single-dish survey searching for methanol maser variability, showing that a large proportion of masers are variable and often periodical.



Rocco Lico presents the conclusions of his talk.

D. Dall’Olio presented observations with eMERLIN of methanol maser polarization in the star cluster W75N. New details about the cluster’s structure were revealed, along with the conclusion that CH_3OH lines can be used as a probe of magnetic field in young massive stars. In another talk, L. H. Quiroga-Nuñez described the use of the distribution of 6.7 GHz methanol masers as a tool to derive the parameters characterizing our galaxy with the help of VLA observations in the BeSSeL project. The only talk that did not focus on methanol was by F. Kamali, presenting 33 GHz continuum observations of a sample of edge-on H_2O megamaser disk galaxies. Initial results show that 87 % of the (mostly Seyfert 2) galaxies show such a radio continuum emission.

In Day 3, there was a single session devoted to radio astronomy instrumentation and techniques. The effect of wind farms on radio astronomical observations with the Ventspils University College VIRAC’s 32 m telescope was explored by A. Baranovskii, who concluded that occasionally the observations can be disturbed by radiation reflections from wind turbine masts and blades. V. Bezrukovs continued the talk about VIRAC’s telescopes with a presentation about their modernization, which included removal and putting back the 32 m and 16 m telescope dishes. Evaluation of noise and nonlinearities in the correlation of two Gaussian signals with different methods led to the conclusion that 9-bit quantization is likely to be sufficient for astronomical purposes (S. Chiarucci). Observations of meteor-induced radio emission by V. Vovk indicate approximately one meteorite strike per minute. In the final

presentation in the conference, P. Zemlanukha dealt with the details of combining interferometrical and single-dish observations with the software package MIRIAD and data on the bipolar outflow in S255 region (IRAM 30m and SMA). His conclusion was that the combination is important and may reveal new morphological features in the observed object.

2.2 Meeting Programme

| 45th YERAC'2015 PROGRAMME | | |
|--------------------------------------|--|---|
| Tuesday, August 18 | | |
| 18:00-21:00 | Registration and Welcome party, Ventspils University College, main entrance | |
| Wednesday, August 19 D104 auditorium | | |
| 8:30 | Breakfast D 103 auditorium | |
| | Morning session: chair Juris Freimanis | |
| Time | Speaker | Presentation |
| 09:00-09:30 | Registration | |
| 9:30 - 9:50 | V. Avotiņš, A. Vrubļevskis, representative of Ventspils City Council, representative of JIVE | Opening speeches |
| 09:50 - 10:30 | Paragi Zsolt | Radio astronomy on the fringes: from bits to parsecs |
| 10:30 - 11:00 | Coffee break | |
| Session 1: Stars | | |
| 11:00 - 11:20 | Bezrukovs Dmitrijs | The solar radio astronomy in Ventspils |
| 11:20 - 11:40 | Berezina Marina | The High Time Resolution Universe Pulsar Survey - the North |
| 11:40 - 12:00 | Nikitina Elena | Space velocities of radio pulsars |
| 12:00 - 12:20 | Metodieva Yanina | Radio flares/bursts in dMe stars and brown dwarfs |
| 12:20 - 12:40 | Octau Franck | Searching new pulsars with the Nançay Radio Telescope |
| 12:40 - 13:00 | Skoryk Anastasiia | Fine structure of the Pulsar Decametric Radiation of PSRs J0243+6257, B0809+74 and B0950+08 |
| 13:00 - 14:00 | Lunch A 108 auditorium | |
| | Afternoon session: chair Igor Zinchenko | |
| Time | Speaker | Presentation |
| Session 2: Interstellar medium | | |
| 14:00 - 14:20 | Garcia- Garcia Enrique | Mapping methanol in the prestellar core L1689B |
| 14:20 - 14:40 | Kalvāns Juris | New progress on molecule desorption in dark cloud cores |
| 14:40 - 15:00 | Keller Denise | Tracing the chemistry in the clumpy shells around carbon-rich AGB-stars with the VLA |
| 15:00 - 15:20 | Pericaud Jessica | The HD141569A hybrid disk |
| 15:30 - 16:00 | Coffee break | |
| Session 3: Galaxies | | |
| 16:00 - 16:20 | Herrero-Illana Ruben | Tracing molecular gas in (U)LIRGs |
| 16:20 - 16:40 | Ponomareva Anastasia | Resolved HI kinematics as a key to the definite Tully-Fisher relation |
| 16:40 - 17:00 | Seethapuram Sridhar Sarvesh | Multifrequency observation of the Pinwheel galaxy (M101) |
| | End of Day 1 | |

| Thursday, August 20 D 104 auditorium | | |
|--|---|--|
| 08:00 Breakfast D103 auditorium | | |
| Morning session: chair Zsolt Paragi | | |
| Time | Speaker | Presentation |
| 09:10 – 9:50 | Zinchenko Igor | Scientific drivers and facilities of the millimeter and submillimeter wave astronomy |
| Session 4: Active Galactic Nuclei | | |
| 09:50 - 10:10 | Brienza Marisa | Dying and restarted radio galaxies: a LOFAR perspective |
| 10:10 – 10:30 | Kim Kwang Seong | Faraday Rotation Measure Synthesis of intermediate redshift quasars as a probe of intervening matter |
| 10:30 - 11:00 Coffee break | | |
| 11:00 - 11:20 | Lico Rocco | Gamma-ray and Very Long Baseline Polarimetry connection in the TeV blazar Mrk 421 |
| 11:20 - 11:40 | Nair, G. Dhanya | 86 GHz VLBI Survey of Ultracompact radio emission in Active Galactic Nuclei |
| Session 5: Galaxy Clusters | | |
| 11:40 – 12:00 | Clarke Alex | A1682: An Ultra Steep Spectrum Radio Halo |
| 12:00 – 12:20 | Dumba Cosmos | The radio relic in galaxy cluster Abell 115 |
| 12:20 – 12:40 | Kokotanekov Georgi | Feedback galaxy clusters in LOFAR's MSSS |
| 12:40 – 13:00 | Rajpurohit Kamlesh | Radio relic in CIZA J0649.3+1801 ? |
| 13:00 - 14:00 Lunch A 108 auditorium | | |
| Afternoon session: chair Ivars Šmēlds | | |
| Time | Speaker | Presentation |
| Session 6: Cosmic Masers | | |
| 14:00 – 14:20 | Aberfelds Artis | Methanol masers |
| 14:20 – 14:40 | Dall'Olivo Daria | Feedback in massive star formation: eMERLIN maser polarization observations |
| 14:40 – 15:00 | Dzielak Marta | Looking for weak methanol maser emission at 6.7 GHz |
| 15:00 – 15:20 | Kamali Fateme | Radio Continuum Study of H ₂ O-disk-megamaser Galaxies |
| 15:30 - 16:00 Coffee break | | |
| 16:00 – 16:20 | Olech Mateusz | Search for methanol maser variability |
| 16:20 – 16:40 | Quiroga Nunez Luis Henry | Simulation of methanol masers distribution to constrain galactic parameters |
| 16:40 – 17:00 | Sarniak Rafał | A WISE-based analysis of TMSC |
| 18:30- 22:00 Conference dinner, The Adventure Park of Ventspils, Saules street 141, Ventspils | | |
| Friday, August 21 D 104 auditorium | | |
| 08:00 Breakfast D103 auditorium | | |
| Morning session: chair Jānis Trokšs | | |
| Time | Speaker | Presentation |
| Session 7: Radio Astronomy Instrumentation and Methods | | |
| 09:30 – 9:50 | Baranovskii Andrei | Wind turbine impact to radio astronomical observations |
| 09:50 – 10:30 | Bezrukovs Vladislavs | Modernization of VIRAC radio telescopes: achieved results and future plans |
| 10:30 – 11:00 Coffee break | | |
| 11:00 – 11:20 | Chiarucci Simone | Quantization effects |
| 11:20 – 11:40 | Vovk Vasyl | Research meteor activity using over-horizon FM-broadcast transmitters |
| 11:40 – 12:00 | Zemlyanukha Petr | Combination of interferometrical and single dish data in S255 high star mass formation area analysis |
| 13:00 - 14:00 Lunch A 108 auditorium | | |
| 14:00 | Depart for VIRAC radio telescope complex in Irbene | |
| 23:00 | Depart for Ventspils | |
| Saturday August 22 | | |
| 08:00 Breakfast D103 auditorium | | |

2.3 Participants List

| No | Surname | Name | Organisation | Country |
|----|---------------------|----------------|---|-----------------|
| 1 | Fateme | Kamali | Max Planck Institute for Radio Astronomy | Germany |
| 2 | Keller | Denise | Max-Planck-Institut für Radioastronomie | Germany |
| 3 | Ruben | Herrero-Illana | IAA-CSIC | Spain |
| 4 | Seethapuram Sridhar | Sarrvesh | Kapteyn Institute | The Netherlands |
| 5 | Dzielak | Marta | Nicolaus Copernicus University | Poland |
| 6 | Kokotanekov | Georgi | ASTRON | The Netherlands |
| 7 | Nair, G. | Dhanya | Max Planck Institute for Radioastronomy | Germany |
| 8 | Skoryk | Anastasiia | Institute of Radio Astronomy of NAS of Ukraine | Ukraine |
| 9 | Chiarucci | Simone | University of Florence / INAF | Italy |
| 10 | Franck | Octau | Orléans - LPC2E - CNRS | France |
| 11 | Quiroga Nunez | Luis Henry | JIVE / Leiden Observatory | The Netherlands |
| 12 | Brienza | Marisa | ASTRON | The Netherlands |
| 13 | Garcia Garcia | Enrique | IPAG, Institut de Planétologie et d'Astrophysique de Grenoble | France |
| 14 | Dumba | Cosmos | Thüringer Landessternwarte Tautenburg | Germany |
| 15 | Zucca | Pietro | Trinity College Dublin | Ireland |
| 16 | Vovk | Vasyl | RI NAO | Ukraine |
| 17 | Berezina | Marina | Max Planck Institute for Radio Astronomy | Germany |
| 18 | Sarniak | Rafał | Nicolaus Copernicus University | Poland |
| 19 | Rajpurohit | Kamlesh | Thüringer Landessternwarte Tautenburg | Germany |
| 20 | Kim | Kwang Seong | ETH | Switzerland |
| 21 | Olech | Mateusz | Nicolaus Copernicus University | Poland |
| 22 | Nikitina | Elena | Pushchino Radio Astronomy Observatory | Russia |
| 23 | Dall'Olio | Daria | Onsala Space Observatory, Chalmers University | Sweden |
| 24 | Metodieva | Yanina | Armagh Observatory | United Kingdom |
| 25 | Lico | Rocco | Bologna University and IRA/INAF | Italy |
| 26 | Clarke | Alex | Manchester University | United Kingdom |
| 27 | Ponomareva | Anastasia | Kapteyn Astronomical Institute | The Netherlands |
| 28 | Pericaud | Jessica | Laboratoire d'Astrophysique de Bordeaux | France |
| 29 | Paragi | Zsolt | Joint Institute for VLBI ERIC (JIVE) | The Netherlands |
| 30 | Zemlyanukha | Petr | Institute of Applied Physics of the Russian Academy of Sciences | Russia |
| 31 | Aberfelds | Artis | Ventspils University College and University of Latvia | Latvia |
| 32 | Zinchenko | Igor | Institute of Applied Physics of the Russian Academy of Sciences | Russia |
| 33 | Bezrukovs | Dmitrijs | VIRAC Ventspils University College | Latvia |
| 34 | Kalvāns | Juris | VIRAC Ventspils University College | Latvia |
| 35 | Bezrukovs | Vladislavs | VIRAC Ventspils University College | Latvia |

2.4 Meeting Photo



2.5 Information of the EC financial contribution

The RadioNet3 financial contribution (approx. 9000€) was used to cover the full accommodation of the participants and expenses of the local organisation (e.g. poster, webpage, badges).

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