

REPORT ON THE RADIONET3 NETWORKING ACTIVITY

TITLE: **LOCATING ASTROPHYSICAL TRANSIENTS**

DATE: 13-17 May 2013

TIME: 5 DAYS

LOCATION: *LEIDEN, NETHERLANDS*

MEETING WEBPAGE [http://www.lorentzcenter.nl/lc/web/2013/560/info.php3?
wsid=560](http://www.lorentzcenter.nl/lc/web/2013/560/info.php3?wsid=560)

HOST INSTITUTE: *LORENTZ CENTER*

PARTICIPANTS NO: 55

REPORT:

1. Agenda and/or programme of the meeting

Monday, 13 May 2013

9:00-10:00 Arrival, office assignment, coffee and tea
10:00-10:15 Welcome by the manager of the Lorentz Center **Mieke Schutte**
10:15-10:30 **Zsolt Paragi**: Workshop outline and goals

*Introductory Lecture Session, setting the scene (chair **Zsolt Paragi**)*

10:30-11:00 **Thomas Prince** (invited): Palomar Transient Factory
11:00-11:30 **Mansi Kasliwal** (invited; Skype): Transients in the local Universe: from novae to SNe
11:30-12:00 **Huib J. van Langevelde** (invited): The future of the European VLBI Network

12:00-13:30 Lunch and informal discussions

*Discussion Session I – Supernovae (chair **Rob Beswick**)*

13:30-14:00 **Miguel A. Perez-Torres** (invited): EVN observations of SNe in ULIRGs
14:00-14:15 **Kunal Mooley**: VLA transient survey of SDSS stripe 82
14:15-14:30 **Martin Bell**: Exploring the low frequency transient and variable radio sky with the Murchison Widefield Array
14:30-15:00 **Rob Beswick** - Discussions

15:00-15:30 Coffee and tea break

*Discussion Session II – Pulsars (chair **Joeri van Leeuwen**)*

15:30-16:00 **Victoria Kaspi** (invited): Radio Pulsar Basics: Searching, Timing and Populations
16:00-16:30 **Adam Deller** (invited): Pulsar astrometry with VLBI: applications, status and outlook
16:30-16:45 **Dan Thornton**: Fast Radio Bursts - a population of millisecond radio transients
16:45-17:15 **Joeri van Leeuwen** - Discussions
17:15-17:30 Poster introductions by **Sándor Frey**, **Yang Jun** and **Jörg Rachen**
17:30 Wine and Cheese party

Tuesday, 14 May 2013

*Discussion Session III – Microquasars (chair **Stéphane Corbel**)*

9:00-9:30 **James Miller-Jones**: Introduction to microquasars
9:30-10:00 **Gabriela Vila**: Radiative jet models for low-mass X-ray binaries
10:00-10:15 **Zsolt Paragi**: MAXI J1659-152, the shortest orbital period BHXRB with VLBI
10:15-10:45 Coffee and tea break

*Discussion Session IV – X-ray transients (chair **James Miller-Jones**)*

10:45-11:15 **Eric Kuulkers** (invited): X-ray transients
11:15-11:30 **PeterJonker**: Fast X-ray transients
11:45-12:00 **Stéphane Corbel** - Discussions

- 12:00-13:30 Lunch and informal discussions
- 13:30-15:00 *Parallel group working sessions(proposal plans; fast transients; LOFAR long baselines etc.)*
Informal parallel session: how to plan and propose for e-EVN experiments
 (Paragi/Muxlow)
- 15:00-15:30 Coffee and tea break
- Discussion Session V – Automated Triggering on slow and fast transients*
 (chair **Tom Muxlow**)
- 15:30-15:45 **John Conway** (invited): Automated rapid follow-up EVN observations via real-time e-VLBI – progress and prospects
- 15:45-16:00 **Joeri van Leeuwen**: The Apertif Radio Transient system
- 16:00-16:15 **Keith Bannister**: Prompt follow-up of Gamma ray bursts with the VLBA
- 16:15-16:30 **Andrew Siemion**: Fast transient detection with the (e-)EVN
- 16:30-17:00 **Tom Muxlow** - Discussions

Wednesday, 15 May 2013

*Discussion Session VI – CVs, classical and γ -ray novae (chair **Elmar K rding**)*

- 9:00-9:30 **Patrick Woudt**: Cataclysmic variables
- 9:30-9:45 **Vladimir Lipunov**: Multiwave transients and Global MASTER robotic Net
- 9:45-10:05 **Marcello Giroletti** and **Jun Yang** showing briefly results on γ -ray novae
V407 Cyg and Nova Mon, respectively
- 10:05-10:25 **Elmar K rding** - Discussions
- 10:25-10:45 Coffee and tea break
- 10:45-12:00 *Parallel group working sessions(proposal plans; fast transients; LOFAR long baselines etc.)*
- 12:00-13:00 Lunch

Discussion Session VII – GRBs and the GRB-SN connection
 (chair **Eric Kuulkers**)

- 13:00-13:30 **Jonathan Granot** (invited): GRB jets: theoretical review
- 13:30-14:00 **Michael Bietenholz** (invited) VLBI constraints on Type Ib/c SNe expansion
- 14:00-14:15 **Alexander van der Horst**: Constraining GRB Physics in the New Era of Radio Astronomy
- 14:15-14:30 **Giancarlo Ghirlanda**: The SKA view of Gamma Ray Bursts
- 14:30-15:00 **Alexander van der Horst** - Discussions
- 15:00-15:30 Coffee and tea break

*Discussion Session VIII – Gamma-ray binaries, sources of TeV emission (chair: **S ndor Frey**)*

- 15:30-16:00 **Marc Ribo**: Gamma-ray binaries: latest results and transient emission
- 16:00-16:30 **Andrei Lobanov**: The flaring region(s) in the Crab Nebula
- 16:30-16:45 **Gloria Dubner**: Search for radio counterparts to high energy sources
- 16:45-17:00 **Marc Ribo** - Discussions

17:30 Departure by bus to boat (Zijldijk, Leiderdorp)
18:00-22:00 Boat tour and Indonesian Workshop Dinner
22:00 Return by bus from Harbor Leiden to Leiden Central Station, Lorentz Center and Hotel van der Valk

Thursday, 16 May 2013

*Discussion Session IX – Stellar tidal disruption flares, and transient accretion on SMBHs (chair **Francisco Colomer**)*

9:00-9:20 **Stefanie Komossa** (invited): Flares from stars with tidally disrupted by SMBHs: the multi-wavelength view
9:20-9:40 **Marc Schartmann** (invited): Flare emission from the Galactic Center - expectations for 2013
9:40-9:55 **Sjoert van Velzen**: Radio searches of TDE
9:55-10:15 **Stefanie Komossa** – Discussions
10:15-10:45 Coffee and tea break

*Discussion Session X – Gravitational Waves(chair **Gijs Nelemans**)*

10:45-11:15 **Bangalore Sathyaprakash** (invited): Localizing gravitational wave transients: prospects and challenges
11:15-11:30 **Mario Diaz**: The TOROS project
11:30-11:45 **Takamitsu Tanaka**: Luminous transients from accreting supermassive black hole binaries
11:45-12:00 **Gijs Nelemans** – Discussions
12:00-15:00 eVSAG business lunch [closed]
12:00-13:30 Lunch and informal discussions
13:30-15:00 *Parallel group working sessions(proposal plans; fast transients; LOFAR long baselines etc.)*
15:00-15:30 Coffee and tea break

*Discussion Session XI – Ultra-luminous X-rays Sources and IMBH (chair **Zsolt Paragi**)*

15:30-16:00 **Natalie Webb** (invited): ULXs and intermediate-mass black holes
16:00-16:15 **Franz Kirsten**: High sensitivity observations of the core region of M15 - searching the IMBH
16:15-16:30 **Dávid Cseh**: ULX radio surveys
16:30-17:00 **Zsolt Paragi** - Discussions

Friday, 17 May 2013

Discussion Session XII – Fast transients with LOFAR & SKA precursors
(chair **Bryan Gaensler**)

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|-------------|--|
| 9:00-9:30 | Jason Hessels: I. The LOFAR Transient KSP (for Ralph Wijers) II. LOTAAS: The LOFAR Tied-Array All-Sky Survey for Pulsars and Fast Transients |
| 9:30-9:45 | Olaf Wucknitz (last minute cancellation, talk given by Adam Deller): Localising radio transients with international LOFAR baselines |
| 9:45-10:00 | Neil Young: Detecting Pulsars & Fast Transients with KAT-7:Initial TRAPUM Progress |
| 10:00-10:30 | Bryan Gaensler - Discussions |
| 10:30-10:45 | Coffee and tea break |

Closing Session – Long Baseline SKA and the future of VLBI

- 10:45-11:00 **Steve Croft**: AGN Variability, Tidal Disruptions, and Transients from Next Generation Radio Telescopes
- 11:00-11:30 **Mike Garrett** (invited): SKA, long baselines, and the future of VLBI
- 11:30-12:00 **Steven Tingay** (invited): Conference wrap up and final discussion
– The future of very long baseline transient science in the SKA era
- 12:00-13:30 Lunch

2. Scientific Summary

New generation wide-field instruments, especially SKA pathfinders in the radio regime, will detect a huge number of transient sources that can be followed-up by the very long baseline interferometry (VLBI) technique at the highest possible angular resolution. The main goal of the workshop was to bring together researchers with various backgrounds to review the status of the transient science field, with a special focus on the radio band and VLBI. How to find and localize transients, how to make the best use of a multi-band approach, and how to improve the operations of the European VLBI Network (EVN).

The sessions were organized around topics like X-ray binaries, supernovae, gamma-ray bursts etc., each followed by a discussion session to identify the key scientific questions in the field, and the areas where radio (VLBI) observations could contribute the most. A special session was dedicated to the progress of automated triggering of the EVN and similar projects at other arrays. The NEXPreS eVSAG (e-VLBI Science Advisory Group) had a closed business lunch on 16 May, to discuss the inputs received from the participants on how to improve e-EVN operations. The last day was for presenting the latest results from other SKA pathfinders, and for a brief outlook to the future of VLBI in the SKA era.

The first success of the workshop was the great number of participants that registered; unfortunately we had to make a down-selection and reject some excellent researchers in the field. The second success was the lively atmosphere (within the discussion sessions and in the breaks) which certainly played a great role in the forming of new collaborations during the week. These collaborations meant groups actually working on observing proposal ideas, but also plans were formulated on how to bring the various communities closer (e.g. XMM-EVN, INTEGRAL-EVN). **As a direct output, the eVSAG has prepared an 11 page scientific summary of the workshop with recommendations to be submitted to the EVN Programme Committee and the EVN Consortium Board of Directors.**

The workshop participants arrived from all over the world, USA, Canada, Australia, South Africa, Argentina and several European countries. It was dominated by young participants. Unfortunately the gender balance was not ideal, in spite of the efforts by the organizers. Although we invited a great number of female speakers and discussion leaders, several of them rejected because of other commitments, and some of them accepted but had to cancel in the last minute (Chryssa Kouveliotou and Julie McEnery could not travel because of a NASA last minute decision to cancel trans-atlantic travels; Mansi Kasliwal could not travel because of health issues, but she gave a presentation through Skype). Stefanie Komossa, Gabriele Vila, Gloria Dubner and Victoria Kaspi were invited speakers and they did attend the workshop.

The most important scientific result presented was the discovery of 4 new Lorimer-type fast transients (by Dan Thornton). In general, finding and localizing fast transients featured in a number of talks, to the pleasant surprise of the organizers. Another important result discussed on the corridors was the parallax distance determination of the dwarf nova system SS Cyg using triggered EVN and VLBA observations (appeared in Science just a few days after the workshop; published by the team lead by James Miller-Jones). But there were several other occasions when mobile phone cameras took snapshots of "secret" slides shown during the presentations. The format of the workshop perfectly suited our goals, we would organize the sessions almost exactly the same way next time. We found that a discussion session for the morning and one for the afternoon is sufficient; those sessions that were left "free-floating" were usually much more productive than the well-organized ones that were sometimes dominated by the discussion leader a bit too much. The local organization was just excellent. It was a huge relief to be able to connect our review speaker Mansi Kasliwal through Skype in the very first session, and see that everything works beautifully.

We expect to see a number of new results resulting directly from this workshop. The first of these have already been published. A newly-formed group teamed-up to observe a new type of AGN outburst (not even covered in the workshop topics) with the e-EVN. The first results were reported in an Astronomer's Telegram (Atel #5125, by Jun Yang et al.).

We thank to the Lorentz Center for this fantastic experience, and to RadioNet3 and NEXPreS for additional support.

Joeri van Leeuwen (Dwingeloo, Netherlands)
Zsolt Paragi (Dwingeloo, Netherlands)

Zsolt Paragi
Dwingeloo, 2013 June 21

3. **Attendance list (incl. participant names, affiliation and country) signed by the participants and confirmed by the organizer**

The participant list is given below the workshop photo. Those participants that received financial support from the workshop (SOC, invited speakers, or supported young participants) are highlighted. The financial support came from three sources, Lorentz Center, RadioNet3 and NEXPreS.



Keith Bannister (CSIRO, Epping NSW, Australia),
Martin Bell (U. Sydney/CAASTRO, Sydney, Australia),
Rob Beswick (Manchester Univ., United Kingdom),
Michael Bietenholz (HartRAO, Krugersdorp, South Africa),
Francisco Colomer (IGN, Madrid, Spain),
John Conway, (Chalmers UT, Onsala, Sweden),
Stéphane Corbel (U. Paris Diderot, Gif sur Yvette Cedex, France),
Steve Croft (Berkeley, CA, United States),
Dávid Cseh (RU Nijmegen, Netherlands),
Adam Deller (Astron, Dwingeloo, Netherlands),
Mario Diaz (U. Texas, Brownsville, United States),
Gloria Dubner (IAFFE, Buenos Aires, Argentina),
Sándor Frey (FÖMI SGO, Budapest, Hungary),
Bryan Gaensler (U. Sydney/CAASTRO, Redfern, Australia),
Michael Garrett (Astron/Leiden Univ., Dwingeloo, Netherlands),
Giancarlo Ghirlanda (INAF-O. Brera, Merate, Italy),
Marcello Giroletti (INAF-IRA, Bologna, Italy),
Jonathan Granot(OUI, Raanana, Israel),
Jason Hessels (Astron, Dwingeloo, Netherlands),
Peter Jonker (SRON, Utrecht, Netherlands),
Mansi Kasliwal (Princeton U., Pasadena, United States -- Skype),
Victoria Kaspi (McGill U., Montreal, Canada),
Franz Kirsten (U. Bonn, Bonn, Germany),
Elmar Körding (RU Nijmegen, Nijmegen, Netherlands),
Stefanie Komossa (MPIfR, Bonn, Germany),

Erik Kuulkers (ESAC, Villanueva de la Cañada, Spain),
 Vladimir Lipunov (Sternberg Astron. I., Moscow, Russia),
Andrei Lobanov (MPIfR, Bonn, Germany),
James Miller-Jones (CIRA, Perth, Australia),
 Javier Moldón (Astron, Dwingeloo, NL),
Kunal Mooley (Princeton U., Pasadena, United States),
Tom Muxlow (Manchester U., Manchester, United Kingdom),
Gijs Nelemans (RU Nijmegen, Netherlands),
Zsolt Paragi (JIVE, Dwingeloo, NL),
Miguel Perez-Torres (IAA-CSIC, Granada, Spain),
Thomas Prince (Princeton U., Pasadena, CA, United States),
 Jörg Paul Rachen (RU Nijmegen, Nijmegen, Netherlands),
Marc Ribó (U. Barcelona, Barcelona, Spain),
Bangalore Sathyaprakash (Cardiff U., Cardiff, United Kingdom),
Marc Schartmann (MPE Garching, München, Germany),
 Andrew Siemion (Berkeley, California, United States),
 Takamitsu Tanaka (MPA Garching, Garching, Germany),
 Dan Thornton (U. Manchester, Manchester, United Kingdom),
Steven Tingay (CIRA, Bentley, Australia),
 Manuel Torres (SRON, Utrecht, Netherlands),
 Alexander Van der Horst (U. Amsterdam, Amsterdam, Netherlands),
 Huib Van Langevelde (JIVE/Leiden U., Dwingeloo, NL),
Joeri Van Leeuwen (Astron, Dwingeloo, NL),
 Sjoert Van Velzen (RU Nijmegen, Netherlands),
Gabriela Vila (IAR, Villa Elisa, Argentina),
Brian Warner (U. Cape Town, Rondebosch, South Africa),
Natalie Webb (IRAP, Toulouse, France),
Patrick Woudt (U. Cape Town, Rondebosch, South Africa),
 Olaf Wucknitz (U. Bonn, Bonn, Germany --last minute cancelled),
 Jun Yang (JIVE, Dwingeloo, NL),
 Neil Young (Wits U., Johannesburg, South Africa),
 Charles Yun (JIVE, Dwingelo, NL)

4. Financial Report / RadioNet3 contribution

RadioNet3 contributed 5000 Euros to the event cost. A financial report will be issued by the Lorentz Center.

5. Conference Proceedings and Web page

The webpage of the workshop:

<http://www.lorentzcenter.nl/lc/web/2013/560/info.php3?wsid=560>

Selected review articles will be published in PASA:

<http://journals.cambridge.org/action/displayJournal?jid=PAS>

A scientific report was written by the NEXPreS eVSAG, that will be likely publicly available after further discussions within the EVN PC and EVN CBD. NEXPreS webpage:

<http://www.nexpres.eu/>