



# Report from the event supported by RadioNet

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**TITLE** *REVISITING NARROW-LINE SEYFERT 1 GALAXIES AND THEIR PLACE IN THE UNIVERSE*

**DATE:** *10-04-2018, 13-04-2018*

**LOCATION:** *PADOVA, ITALY*

**MEETING WEBPAGE:** *<HTTPS://INDICO.ICT.INAF.IT/EVENT/543/OVERVIEW>*

**HOST INSTITUTE:** *UNIVERSITY OF PADOVA*

**RADIONET  
BENEFICIARY / NO:** *INAF / 4*

# Report:

## 1. SCIENTIFIC SUMMARY

- *Please provide a scientific summary of the event, including the initial goals and the most relevant results presented. You may also include some figures (with captions), which may be considered the highlights of the event.*
- *Describe clearly the impact of the event for the RadioNet community.*
- *Insert the event webpage*

*Please make this part no longer than two pages, plus figures (if it applies to the event).*

The aim of this conference, held in Padova Botanical Garden between 2018 April 10-13, has been to gather world-wide experts on the investigation of Narrow-Line Seyfert 1 galaxies (NLS1s), to assess our present understanding of this peculiar objects. After more than 30 years of investigation, it is clear that NLS1s represent a key element in the picture of active galactic nuclei (AGN) astrophysics, with many properties that are matter of ongoing debate. The conference was proposed as a development of a previous event, designed to present a summary of the overall situation of this field, including discussion of recent discoveries, new conclusions and still open questions.

The conference plan included invited review talks (40 min), contributed talks (20 min), and posters. During the third day, a one-hour session dedicated to Lucrezia Cornaro has been devoted to the topic of gender balance in astrophysics. The schedule of the conference was organized in four different topics, one per day.

During the first day (April 10), the main topic was optical properties of NLS1s. The optical band, indeed, is where the original NLS1 classification came from. One of the most relevant improvement was that shown by Dr. Rakshit, supported by RadioNet, who presented a new large sample of NLS1s derived from the Sloan Digital Sky Survey, bringing the number of known objects from around 1000 to more than 11000. A large debate was devoted to the matter of iron in NLS1s spectra, which provided robust evidence for the presence of fast inflows of unknown origin. We also discussed the results of new reverberation mapping campaigns that, by means of repeated observations, provided precious details about the central engine properties, confirming the low black hole mass of NLS1s.

The second day (April 11) was entirely devoted to the radio properties of NLS1s. During this session, important results obtained with RadioNet facilities have been presented (EVN, Effelsberg, Metsahovi). The most interesting result was the detection, obtained with Metsahovi at 37 GHz by Prof. A. Lähteenmäki, of some radio-quiet NLS1s. This amazing discovery shows that relativistic jets are present not only in the well-known radio-loud objects, but also among radio-quiet sources, and that even these typically “weak” jets can present some extreme properties. The detection at such high frequency indeed presents a challenge for our current understanding of relativistic jets. This point is by far the most significant for the RadioNet community, because it will draw new interest on this class of sources, and can be of crucial importance for the community of radioastronomers.

During the third day (April 12) the main topic was the central engine as seen from the X-rays. The session indicated that the origin of X-rays in NLS1s, and in particular the spectral complexity that is often observed, is still highly controversial. A new, orientation-based model was presented by Prof. C. Done in order to explain the unpredictable behavior of some objects at these frequencies, but no consensus has been yet reached on this point. A special one-hour session has been dedicated instead to the topic of gender balance in astrophysics. The session, attended with interest by all the participants, led in the end to a debate,

confirming the importance of this crucial issue, and that much work must be done in the next years to finally solve the disparity between genders in astrophysics and in science in general.

The last session on day 4 (April 13) finally was dedicated to one of the most intriguing aspects of NLS1s, that is their black hole mass and its relation with the host galaxy. Thanks to infrared and optical observations, new important results were presented, showing that the host galaxy is typically a spiral with a pseudobulge also for high redshift objects, thus confirming that the black hole mass of NLS1s is indeed lower with respect to other AGN. The same result was obtained also via the modeling of the spectral energy distribution of several radio-loud NLS1s, leading therefore to the conclusion that NLS1s are a young evolutionary phase of active galactic nuclei, and likely the analog of early quasars observed in present day Universe.

The RadioNet community has been actively involved in the conference. As mentioned before, they had a unique chance to present some of the most interesting results of the entire meeting, providing a strong visibility for RadioNet facilities. Furthermore, the open discussion during coffee breaks and social events allowed the development of new collaborations between the RadioNet community and other researchers working with facilities at different frequencies. This kind of result cannot be tangibly shown right now, but will be clear in the long term, when these newborn collaborations will lead to new projects carried on with RadioNet facilities.

The website link is:

<https://indico.ict.inaf.it/event/543/>

## 2. AGENDA OF THE EVENT

- *Insert the detailed agenda of the event, including the title of the presentations and speakers (name/institutes/countries).*

The detailed program of the conference is provided in the attachment, and can be also found online at:

<https://indico.ict.inaf.it/event/543/page/156-scientific-programme>

## 3. PARTICIPANTS

- *Describe in few sentences the participants, i.e. geographical distribution, presence of young researchers and students, fraction of women, invited experts (especially when they received the RadioNet support).*
- *Insert the conference picture when possible*
- *Insert the attendance list (including name, affiliation and country) – signed by the participants or signed by the organisers (n case of heavy burden with collecting all participant signatures).*

The geographical distribution of the participant is shown in Fig.1. They came from 23 different countries, and all continents. The total number of registered participants was 73, 45 men and 28 women (61-39%), with 19 students (25%). The ratio of contributed talks showed a higher women participation (58-42%). The invited experts supported by RadioNet provided very relevant contributions to the conference, presenting some of the most suggestive results, such as the largest survey of NLS1s to date and the detection of several new spiral galaxies harboring radio-loud objects. The list of participants with their signatures is attached.

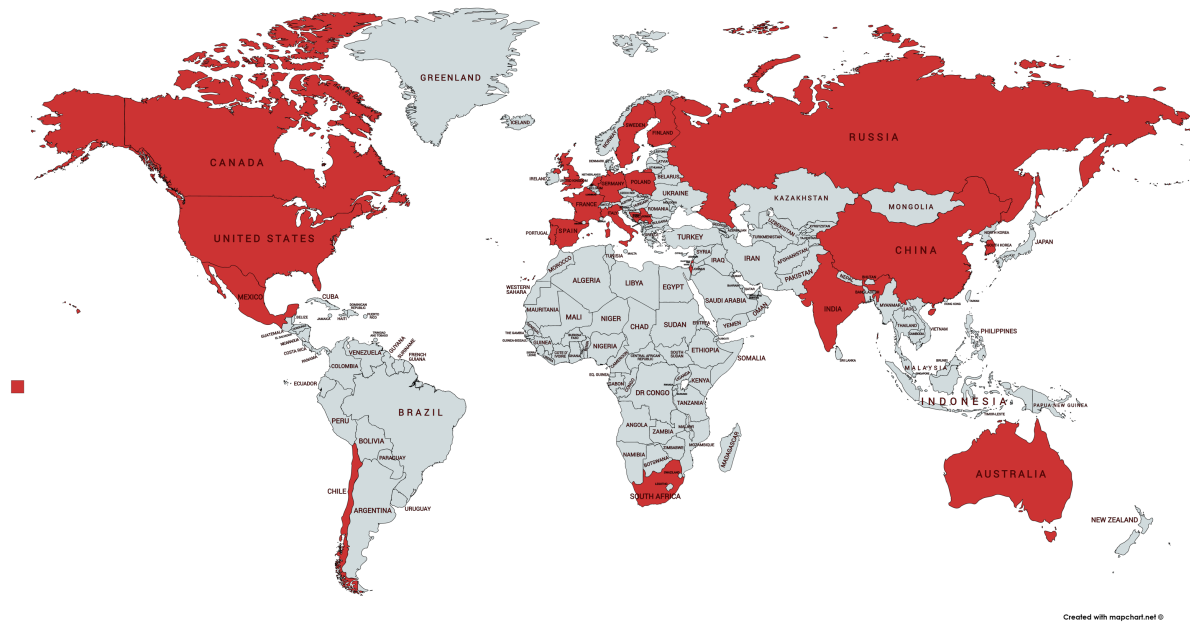


Fig.1. Countries of origin of the participants at the conference.



Fig.2 Conference picture

#### 4. RADIONET FINANCIAL CONTRIBUTION

- *Please describe the how the financial support from RadioNet was used and provide a list of the supported participants (including their nationality).*

RadioNet support will be used to support the travel expenses of the 5 supported researchers. The requested contribution is 400€ per person.

- 1) Ms. Emilia Järvelä, Ph.D. student at Aalto University Metsähovi Radio Observatory (Finland), presented a contributed talk titled "Host galaxies of jetted narrow-line Seyfert 1 galaxies".
- 2) Dr. Suvendu Rakshit, postdoctoral researcher at Seoul National University (Republic of Korea), presented a contributed talk titled "Narrow line Seyfert 1 galaxies in the era of large surveys".
- 3) Dr. Main Pal, postdoctoral researcher at Physical Research Laboratory (India), presented a contributed talk titled "The variability of soft X-ray excess and UV emission: a case study of a NLS1 II Zw 177".
- 4) Dr. Victor Oknyansky, senior researcher at Moscow University (Russia), presented a contributed talk titled "Changing-look NLS1s?".
- 5) Dr. Veeresh Singh, faculty member at the Physical Research Laboratory (India), presented a contributed talk titled "Kpc-scale radio-jets in NLS1 galaxies".

#### 5. PUBLICATIONS

- *In case of future publication - please provide additional information: place & date. Remember to insert the acknowledgment of the RadioNet support:*

*The project leading to this publication has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 730562 [RadioNet]*

The proceedings of the conference will be published on Proceedings of Science (SISSA, Trieste, Italy). The website for the proceedings is already available at the following link:

<https://pos.sissa.it/cgi-bin/reader/conf.cgi?confid=328>

We will provide the full list of DOI of the proceedings as soon as they become available.

# Revisiting narrow-line Seyfert 1 galaxies and their place in the Universe

April 10-13, 2018

Padova Botanical Garden



## CONFERENCE PROGRAM

April 10th, 2018

MORNING SESSION

CHAIR: P. Rafanelli

09:30 Welcome address

09:50 **Luka POPOVIC**: Polarization in the broad lines of NLSy1 galaxies

10:10 **Paola MARZIANI**: Narrow-line Seyfert 1s: what is wrong in a name

10:30 **Suvendu RAKSHIT**: Narrow Line Seyfert 1 galaxies in the era of large surveys

10:50 **Sina CHEN**: Probing narrow-line Seyfert 1 galaxies in the southern hemisphere

11:10 *Coffee break*

11:40 **Giovanni LA MURA**: Models of optical emission lines to investigate Narrow Line Seyfert 1 galaxies in spectroscopic databases

12:00 **Chen HU**: Fe II reverberation in narrow-line Seyfert 1 galaxies

12:20 **Edi BON**: Fe II velocity shifts in optical spectra of type 1 AGN

AFTERNOON SESSION

CHAIR: W. Kollatschny

14:30 **Bradley PETERSON**: Reverberation Mapping and Implications for Narrow-Line Seyfert 1 Galaxies

14:50 **Pu DU**: Reverberation mapping of narrow-line Seyfert 1 galaxies: shortened Hbeta lags

15:10 **Andrea ROJAS LOBOS**: Modeling time-dependence of continuum and polarized optical-UV emission in AGN

15:30 **Jian-Min WANG**: Saturated luminosity of slim accretion disks in narrow line Seyfert 1 galaxies

15:50 **Victor L. OKNYANSKY**: Changing-look NLS1s?

16:10 *Coffee break*

16:40 **Adam THOMAS**: Interrogating narrow-line regions: Spatially probing metallicity and the radiation field

17:00 **Francesca PANESSA**: Radio and X-ray variability of the NLSy1 Mkn 110

17:20 **Dragana ILIC**: Long-term spectral optical monitoring of Ark 564

April 11th, 2018

MORNING SESSION

CHAIR: L. Foschini

09:30 **Stefanie KOMOSSA**: Optical and high-energy properties of radio-loud Narrow-line Seyfert 1 galaxies (invited)

10:10 **Hui YANG**: On the multi-wavelength properties and black hole mass estimation of several Gamma-ray detected NLS1s

10:30 **Josefin LARSSON**: A close look at the gamma-ray emitting NLSy1 FBQS J1644+2619

10:50 **Daniel KYNOCH**: The gamma-ray emitting NLS1 1H 0323+342 and the disc-jet connection

11:10 *Coffee break*

11:40 **Emmanouil ANGELAKIS**: Optical and radio polarisation properties of gamma-ray emitting NLSy1s  
12:00 **Stefano CIPRINI**: Fermi LAT Flare Advocate seeds for the NLSy1 multi-wavelength science blossom  
12:20 **Patrizia ROMANO**: Prospects for gamma-ray observations of narrow-line Seyfert-1 galaxies with the Cherenkov Telescope Array

### AFTERNOON SESSION

**CHAIR: S. Antón**

14:30 **Matthew LISTER**: Radio Properties of Narrow-Line Seyfert 1 Galaxies (invited)  
15:10 **Preeti KHARB**: Parsec-scale Nuclear Radio Structures in Seyfert Galaxies  
15:30 **Anne LÄHTEENMÄKI**: High-frequency radio properties of NLS1 galaxies  
15:50 **Minfeng GU**: VLBI study of the jets in radio-loud narrow-line Seyfert 1 galaxies  
16:10 *Coffee break*  
16:40 **Marco BERTON**: The JVLA view of NLS1  
17:00 **Enrico CONGIU**: The strange case of Mrk 783  
17:20 **Veeresh SINGH**: Kpc-scale radio-jets in narrow-line Seyfert 1 galaxies

## April 12th, 2018

### MORNING SESSION

**CHAIR: E. Prandini**

09:30 **Bozena CZERNY**: Narrow Line Seyfert 1 galaxies in the context of Quasar Main Sequence (invited)  
10:10 **Annika KREIKENBOHM**: The nature of the gamma-ray emitting PKS 2004-447: CSS or NLS1?  
10:30 **Michael PARKER**: Relativistic spectroscopy of the extreme NLS1 IRAS 13224  
10:50 **Main PAL**: The variability of soft X-ray excess and UV emission: a case study of a NLS1 II Zw 177  
11:10 *Coffee break*  
11:40 **Silvana BADALONI**: The role of the University of Padova  
11:55 **Patrizia CARAVEO**: The glass ceiling and all that  
12:10 **Preeti KHARB**: The working group for gender equity of the Astronomical Society of India

### AFTERNOON SESSION

**CHAIR: P. Kharb**







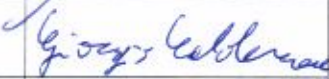


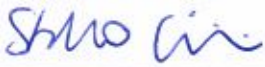




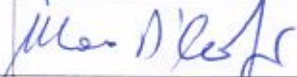




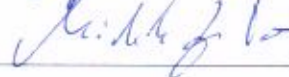
14:30 **Luigi GALLO**: X-ray perspective of Narrow line Seyfert 1 galaxies (invited)  
15:10 **Elisa COSTANTINI**: Ionized outflows in the NLSy1 IZw1: departing from the classical picture  
15:30 **Manuela MOLINA**: Narrow Line Seyfert 1s in the IBISCO sample  
15:50 **Ashutosh TRIPATHI**: Testing strong gravity with RELXILL\_NK and the black hole in Ark 564  
16:10 *Coffee Break*  
16:40 **Elias KAMMOUN**: The nature of X-ray spectral variability in MCG-6-30-15  
17:00 **Chris DONE**: On the underlying physics of NLS1

## April 13th, 2018

### MORNING SESSION



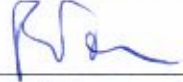










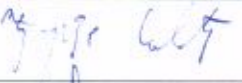



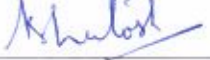
**CHAIR: M. Berton**


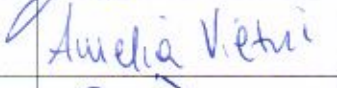

09:30 **James LEFTLEY**: The Polar Dust in ESO323-G77  
09:50 **Bella BOULDERSTONE**: Hot Dust in the Narrow Line Seyfert 1 Galaxy ESO232-G77  
10:10 **Sonia ANTON**: What is in a radio loud NLS1?  
10:30 **Omaira GONZALEZ-MARTIN**: X-ray variability plane using NLSy1 and Sy1: Importance of obscuration  
10:50 **Giorgio CALDERONE**: The mass of NLS1 black holes: reconciling accretion disk and virial estimates  
11:10 *Coffee break*  
11:40 **Jari KOTILAINEN**: The host galaxies of radio-loud vs. gamma-loud Narrow-Line Seyfert 1s  
12:00 **Emilia JÄRVELÄ**: Host galaxies of jetted narrow-line Seyfert 1 galaxies  
12:20 **Final remarks and goodbyes**

Angelakis	Emmanouil	Max-Planck-Institut für Radioastronomie Germany	
Anton	Sonia	University of Aveiro Portugal	
Berton	Marco	Università di Padova Italy	
Bologna	Anna	University of Padova Italy	
Bon	Edi	Astronomical Observatory Belgrade Serbia	
Boulderstone	Bella	University of Southampton United Kingdom	
Busetto	Giovanni	University of Padova Italy	
Calderone	Giorgio	INAF – OATs Italy	
Cattapan	Arianna	University of Padova Italy	
Cecconato	Serena	University of Padova Italy	
Chen	Sina	University of Padova Italy	
Ciprini	Stefano	ASI – Space Science Data Center Italy	 ✓
Ciroi	Stefano	University of Padova Italy	
Congiu	Enrico	University of Padova Italy	
Costantini	Elisa	SRON Netherlands Institute for Space Research Netherlands	
Czerny	Bozena	Center for Theoretical Physics Poland	
D'Onofrio	Mauro	University of Padova Italy	
Dimitrijevic	Milan	Astronomical Observatory Belgrade Serbia	
Done	Chris	University of Durham United Kingdom	
Du	Pu	Institute of High Energy Physics, CAS China	
Sobriño-Figueroa	Catalina	Astronomisches Institut Bochum Germany	
Foschini	Luigi	INAF – OA Brera Italy	
Frezzato	Michele	University of Padova Italy	



Gallo	Luigi	Saint Mary's University Canada	
Gonzalez-Martin	Omaira	IryA Mexico	 v
Gu	Minfeng	Shanghai Astronomical Observatory, CAS China	Minfeng Gu
Hu	Chen	Institute of High Energy Physics, CAS China	Hu Chen
Ilic	Dragana	University of Belgrade Serbia	Dragana Ilic
Jarvela	Emilia	Aalto University Metsahovi Radio Observatory Finland	
Kammoun	Elias	SISSA Italy	
Kharb	Preeti	National Centre for Radio Astrophysics India	Preeti Kharb
Kollatschny	Wolfram	Institute of Astrophysics, Gottingen University Germany	
Komossa	Stefanie	MPIfR, NAOC Germany	St. Komossa
Kotilainen	Jari	FINCA, University of Turku Finland	
Kreikenbohm	Annika	University of Wuerzburg Germany	
Kynoch	Daniel	Durham University United Kingdom	
La Mura	Giovanni	University of Padova Italy	Giovanni La Mura
Lahteenmaki	Anne	Aalto University Metsahovi Radio Observatory Finland	
Larsson	Josefin	KTH Royal Institute of Technology Sweden	
Leftley	James	ESO Chile	
Li	Yan-Rong	Institute of High Energy Physics, CAS China	Li Yanrong
Lister	Matthew	Purdue University USA	
Malizia	Angela	INAF OAS Italy	Angela Malizia
Marafatto	Luca	INAF - OAPd Italy	Luca Marafatto
Marziani	Paola	INAF - OAPd Italy	Paola Marziani
Molina	Manuela	INAF OAS Italy	

Oknyansky	Victor	SAI, MSU Russia	
Pal	Main	Physical Research Institute India	
Panda	Swayamtrupta	Center for Theoretical Physics Poland	
Panessa	Francesca	INAF – IAPS Roma Italy	
Parker	Michael	ESA/ESAC Spain	
Paul	Bynish	University of Johannesburg, SAAO South Africa	
Peruzzi	Tobia	University of Padova Italy	
Peterson	Bradley	STScI, Ohio State University USA	
Popovic	Luka	Astronomical Observatory Belgrade Serbia	
Pozo Nunez	Francisco	HCTPA, University of Haifa Israel	
Prandini	Elisa	University of Padova Italy	
Rafanelli	Piero	University of Padova Italy	
Rakic	Nemanja	University of Banja Luka Bosnia and Herzegovina	
Rakshit	Suwendu	Seoul National University South Korea	
Rojas Lobos	Patricia Andrea	Université de Strasbourg France	
Romano	Patrizia	INAF – OA Brera Italy	
Sani	Eleonora	ESO Chile	
Savic	Đorđe	Astronomical Observatory Belgrade Serbia	
Singh	Veeresh	Physical Research Laboratory India	
Sniegowska	Marzena	Center for Theoretical Physics Poland	
Spiga	Rossella	University of Padova Italy	
Thomas	Adam	Australian National University Australia	
Tripathi	Ashutosh	Fudan University China	

Vercellone	Stefano	INAF – OA Brera Italy	
Vietri	Amelia	University of Padova Italy	
Wang	Jian-Min	Institute of High Energy Physics, CAS China	
Yang	Hui	National Astronomical Observatories, CAS China	