



RadioNet support for engineering events Application form

EVENT INFORMATION	
EVENT TITLE	NOVA Submm Heterodyne Array Workshop
EVENT PLACE	Nunspeet, the Netherlands
EVENT ORGANISER	Th. de Graauw, A. Baryshev, Dutch School for Astronomy (NOVA)
EVENT DATE	9 – 11 March 2017
NO. OF PARTICIPANTS	~70
TOTAL EVENT COST	16000 Euro
OTHER SOURCES OF FUNDING	Grant of Netherlands Scientific Organization (NWO) and Research Council of Sao Palo (FAPESP) to Netherlands Research School of Astronomy (NOVA, RUG)
REQUEST <i>(max. 2,5 pages)</i>	
Requested contribution [EURO]	6000 Euro Total workshop costs will amount to 16k euro. Most participants will pay for their travel and lodging costs themselves. The workshop budget covers the costs of the meeting facilities, travel for some and lodging for all invited speakers.
Use of the RadioNet contribution	The requested funds will be used in parts to pay for venue (meeting rooms) and support of workshop fee (stay, and subsistence) of invited speakers. 3000 Euro is part of cost of venue, meeting-rooms, and 3000 Euro to support fee for 10 invited speakers (10x300 euro)
Topic <input type="checkbox"/>	This workshop is devoted to development of large heterodyne focal plane arrays in mm/submm wavelengths. It is a topic on the edge of rapid development. Due to relative complexity submm/mm wavelength receivers are now predominantly in single pixel/dual frequency configuration. Due to significant progress in local oscillator power, matched input low power intermediate frequency amplifiers and digital processing power building of large format focal plane arrays becomes much more feasible. This workshop will have lead developers from the entire world on the above mentioned field to present state of the art technology and have an open discussion on coherent approach to design/construction of mm/submm arrays for ground/balloon and space facilities. The subject has a direct relation to RADIONET project AETHRA. This work package deals with mm/submm focal plane arrays technology. Many of the RADIONET AETHRA institution and individuals will be present and the event itself is organized by one of the members of AETHRA (RUG). The event is organized just before the ISSTT2017 conference in Köln at close geographical location, which ensures effective international participation. Along with array science & technology discussion, this workshop will also focus of application of technology to the European (participation) facilities such as APEX, ALMA and in future far infrared space missions.
Cross-disciplinary	By its nature, the workshop is cross disciplinary as it combines, in close interaction, superconductor heterodyne detector technology, optics, HEMT amplifiers and digital back-end technology. In addition, goals and benefits for radio astronomy will be discussed, setting the big picture for applications of focal plane arrays for astronomy. Scientists from different generation will be present and there will be a “lesson learned” session providing transfer of knowledge from previous generation

	to the youngsters on focal plane detector arrays. This workshop will stimulate the coherent approach and thus natural exchange of knowledge between different groups and institutions both inside and outside Europe. Key high-tech industrial partners (i.e. Virginia Diodes and RPG/Rohde & Schwartz) from Europe and US are invited to participate.
Impact	This workshop is expected to have significant impact on the collaboration both in Europe (within RadioNet) as well as on collaboration with leading institution in US and elsewhere. This is achieved through a clear focus of the whole group towards focal plane arrays technology development for leading astrophysical facilities. This ensures a very efficient exchange and collaboration of engineers and instrument scientists in the field.
Ethics <input type="checkbox"/>	Workshop is organized following high ethical standard. Equal treatment of all genders and minorities is guaranteed.

Preliminary program for the THz Heterodyne Array Workshop

9-11 March 2017, Nunspeet, the Netherlands
version 18-01-2017

9 March 2017

12:00-13:00	Registration	
13:00-14:00	Lunch	
14:00-16:30	Session 1: Introductory talks	Session Chair:
14:00-14:15	Welcome and introduction, workshop chairs.	
14:15-14:40	Science needs for THz arrays.	P Goldsmith (JPL)
14:40-15:05	Requirements and challenges of submm heterodyne arrays	U. Graf (KOSMA)
15:05-15:30	Integration of THz Heterodyne Receivers: Challenges and Limitations for Large Arrays.	G. Chattopadhyay (JPL)
15:30-15:55	Lessons for THz Heterodyne Arrays from Direct Detection Arrays (MKIDS/TES)	J. Baselmans (SRON/TUD)
15:55-16:15	Discussion	All
16:15-16:30	Tea/Coffee break	
16:30-18:30	Session 2: Heterodyne Arrays Today and More	Session Chair:
16:30-16:55	Overview of Existing Submm Heterodyne Arrays: achievements and lessons	M. Wiedner (LERMA)
16:55-17:10	THz Heterodyne Arrays: Lessons from CHAMP+ and (Up)GREAT	C. Risacher (MPIfR)
17:10- 17:25	THz Heterodyne Array receivers in practice: lessons learned from HIFI.	D. Teyssier (ESA)
17:25-17:50	THz QCL development as local oscillator applications	J. Faist (ETH)
17:50-18:05	Discussion	All
18:05-18:30	Poster presentations (100 seconds each)	All
19:00-20:00	Dinner	
20:00	After Dinner talk: Space borne opportunities for THz heterodyne arrays The OST heterodyne instrument study	P. Goldsmith (JPL) M. Wiedner (LERMA)

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08:30-11:00	Session 3: Designs: Optical/Feeds	Session Chair:
08:30-09:00	Sampling schemes and applicable optics.	N. Trappe (NUIM)
09:00-09:30	Advances in feed- horn array optics for millimetre and submillimetre receivers.	G. Yassin, (U-Oxford)
09:30-10:00	Focal Plane arrays for ALMA: an implementation study	A. Baryshev (NOVA)
10:00-10:30	Discussion	All
10:30-11:00	Tea/Coffee break	
11:00-13:00	Session 4: LO Designs	Session Chair:
11:00-11:30	LO Architectures for Multi-Pixel THz Receivers.	I. Mehdi (JPL)
11:30-12:00	Solid State THz Local Oscillators for SIS and HEB arrays: status and future.	A Maestrini (LERMA)
12:00-12:30	QCL/mixer device configurations for THz heterodyne arrays: experience and future possibilities.	H-W Huebers (DLR)
12:30-13:00	Discussion	All
13:00-14:00	Lunch	
14:00-18:00	Session 5: Mixer/Receiver Designs	Session Chair:
14:00-14:30	Large pixel count focal plane mm heterodyne arrays.	C. Groppi (ASU)
14:30-15:00	Mm/submm heterodyne SIS arrays: present possibilities and future.	K. Schuster (IRAM)
15:00-15:30	Heterodyne THz array receivers: design challenges	V. Belitsky (CTH)
15:30-16:00	Discussion	All
16:00-16:30	Tea/coffee break	
16:30-17:00	Space THz heterodyne HEB receiver arrays: expected performance and challenges	J. Kawamura (JPL)
17:00-17:30	THz heterodyne HEB receivers: options for large arrays and expected performances	K. Jacobs (KOSMA)
17:30-18:00	THz heterodyne HEB-QCL receivers: options for large arrays and expected performances	J. Gao (SRON and TUDelft)
19:00-20:00	Dinner	
	After dinner talk: Ground based observatory opportunities for sub-mm heterodyne arrays: ALMA and large single dishes	R. Laing (ESO)

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08:30-12:00	Session 6: Super- and Semi-conductor technologies	Session Chair:
08:30-09:00	What nano-technology can do to create efficient and integrated components for THz heterodyne arrays.	J. Stake (Chalmers)
09:00-09:30	Ultra-low-power, Ultra-low-noise amplifiers and MMIC Implementations for Heterodyne Arrays.	J-D Gallego (Yebes)
09:30-10:00	Superconducting technology for integrated receivers; frontend and backend components.	V. Koshelets (IREE)
10:00-10:30	Digitization and Spectrometers for large heterodyne arrays.	B. Klein, (MPIfRA)
10:30-11:00	Discussion.	All
11:00-11:30	Tea/Coffee break	
11:30-13:00	Session 7: Synthesis and Wrap-up	Session Chair:
11:30-12:00	Workshop Synthesis discussion.	Panel of Session chairs
12:00-12:30	Workshop summary and conclusions.	W. Jellema (NOVA)
12:00-12:30	Closing	
12:30-13:30	Lunch	
14:00	Departure bus to Cologne.	