# PROGRAM

## LOFAR Magnetism Key Science Project Annual Meeting
## Nijmegen, 9-12 March 2015

**MONDAY 9 MARCH**

10:30 – 12:00 Registration (room: Serre)

12:00 - 13:00 Lunch

12:45 – 13:00 Registration

13:00 - 13:15 Welcome words by Paul Groot, chair Radboud Astrophysics (room: Tuinzaal)

13:15 - 13:35 MKSP status update - Rainer Beck

13:35 - 14:05 LOFAR status update - Roberto Pizzo

14:05 - 14:25 MSSS status report – speaker TBC

14:25 - 14:45 MSSS polarization progress – David Mulcahy

14:45 - 15:05 MSSS nearby galaxies – Krzysztof Chyzy

15:05 – 15:30 Discussion LOFAR and MSSS – led by George Heald

15:30 – 16:00 Coffee/Tea break

16:00 - 16:30 Surveys KSP Tier1 survey - Tim Shimwell

16:30 – 17:00 Presentation Cycle 4 proposals

*Progress reports of working groups*

17:00 – 17:20 LOFAR HBA observations of IC 342
+ progress report WG1: Milky Way - Cameron Van Eck

17:20 – 17:40 Pulsars with LOFAR
+ progress report WG2: Pulsars – Aristeidis Noutsos

17:40 – 18:00 Progress report WG3: Nearby galaxies - Wojciech Jurusik, Blazej Nikiel-Wroczynski, Natalia Nowak

18:00 – 18:15 Progress report WG4: giant radio galaxies – Emanuela Orru

18:15 – 18:30 Progress report WG5: Intergalactic filaments – Torsten Ensslin

19:30 DINNER – at Restaurant De Keurvorst in Ravenstein
Presentation by Frank Verbunt "Megalithic Astronomy"

**TUESDAY 10 MARCH**

Science Talks

09:00 – 9:20 The LOFAR view on NGC 5033 – Katharina Sendlinger

09:20 – 9:40 LOFAR observations of the nearby spiral galaxy, M101 - Sarrvesh Sridhar

09:40 – 10:00 LOFAR observations of Abell 1682 – Alex Clarke

10:00 – 10:20 Investigating the cosmic ray propagation in M51 at LOFAR Frequencies - David Mulcahy

10:20 – 10:40 LOFAR observations of diffuse polarised material at high Galactic latitudes - Vibor Jelic

10:40 – 11:00 Precise LOFAR observations of Rotation Measures towards pulsars – Charlotte Sobey

11:00 – 11:30 Coffee

11:30- 11:50 Observing large-scale structure of the entire northern sky by using TBB data from a LOFAR single station - Jana Koehler

11:50 – 12:10 Statistical methods for the analysis of rotation measure grids in large-scale structures – Valentina Vacca

12:10 – 12:30 The LOFAR view of Massive Star Formation – Marta Alves

12:30 - 13:50 Lunch

13:50 – 14:10 Experiences in LOFAR HBA processing – Marco Iacobelli

14:10 – 14:30 NGC 5775 – George Heald

14:30 - 15:30 First half Business Meeting
- Revision of the management structure
  Revision of the science goals
- Revision of the working groups
- Communication within the MSKP
- Cooperation with the other KSPs.

15:30 - 16:00 coffee

16:00 – 17:00 Second half Business Meeting

17:00 - 18:00 Discussion on ways to study Galactic Magnetism with LOFAR – led by Torsten Ensslin

**WEDNESDAY 11 MARCH**

9:30 – 10:00 Software development: calibration and imaging – George Heald

- Commissioning progress talks (if any left)
- Discussion on commissioning, computing, etc
- Plans for Busy Days

*Start Busy Days*

10:30 - 11:00 Coffee/tea

12:30 Lunch

15:00 Coffee/Tea

**THURSDAY 12 MARCH**

*Busy Days*

10:30 - 11:00 Coffee/tea

12:30 Lunch

15:00 Coffee/Tea

# ABSTRACTS

## Rainer Beck: MKSP status update

I will review the MKSP status and the goals of the workshop.

## Roberto Pizzo: LOFAR status update

I will review the current status of LOFAR, highlighting ongoing activities and enhancements at the hardware and software level.

## speaker TBC: MSSS status report

## David Mulcahy: MSSS polarization progress

## Krzysztof Chyzy: MSSS nearby galaxies

## Cameron Van Eck: LOFAR HBA observations of IC 342 + progress report WG1: Milky Way

In my talk I will show the latest images from the IC342 field, and discuss some of the challenges in processing the field. I will review my science goals: detecting and characterizing foreground diffuse polarization originating from Milky Way synchrotron emission. I will also discuss what data processing requirements I request from anyone who is willing to share their processed fields with me.

## Aristeidis Noutsos: Pulsars with LOFAR + progress report WG2: Pulsars

Observations with the LOFAR core and international stations have opened a new window into studies of pulsar magnetospheric physics and studies of the interstellar medium. I will report on the recently published investigation of the polarisation properties of 20 pulsars with LOFAR and what they imply about radio-wave propagation through magnetised plasma. In addition, I will give a brief summary of the current activities of the pulsar group, involving the measurement of >100 pulsar RMs and the potential of detecting for the first time intra-cluster magnetisation in globular clusters.

## Wojciech Jurusik, Blazej Nikiel-Wroczynski, Natalia Nowak: Progress report WG3: Nearby galaxies

We will present an update of the MSSS project to study statistical properties of nearby galaxies. Recent improvements in the calibration strategy of the survey data and an extension of the sample of galaxies will be discussed. We will report our results from various LOFAR projects: NGC6946, Stephan Quintet, NGC4449, and suggest future LOFAR projects. A report on the process of setting up the LOFAR software on computer clusters of the Polish Grid Infrastructure will be presented.

## Emanuela Orru: Progress report WG4: giant radio galaxies

## Torsten Ensslin: Progress report WG5: Intergalactic filaments

## Katharina Sendlinger: The LOFAR view on NGC 5033

## Sarrvesh Sridhar: LOFAR observations of the nearby spiral galaxy, M101

I will report on the progress I have made with my lofar dataset of the nearby spiral galaxy M101. I will also present the complementary Westerbork observations of the same galaxy and discuss some of the preliminary scientific results from these two observational campaigns.

## Alex Clarke: LOFAR observations of Abell 1682

Abell 1682 is a massive merging galaxy cluster dominated by a strong central radio galaxy. This cluster also hosts a radio relic, and components of unknown origin. There is also strong evidence for a giant underlying radio halo. I will present my progress with data reduction and my own self calibration strategies, and show results at 150MHz.

## David Mulcahy: Investigating the cosmic ray propagation in M51 at LOFAR Frequencies

## Vibor Jelic: LOFAR observations of diffuse polarised material at high Galactic latitudes

The low radio frequency observations are very sensitive to small column densities of the ISM that are difficult to detect at higher radio frequencies. The wide frequency coverage and good angular resolution of the LOFAR, make LOFAR an excellent instrument for studying Galactic polarized emission. In combination with the RM synthesis, LOFAR observations allow us to study the relative distribution of synchrotron-emitting and Faraday-rotating regions at an exquisite resolution of 1 rad m^-2 in Faraday depth.

Recent observations with LOFAR revealed diffuse polarization in several fields at high Galactic latitudes with surprisingly high brightness temperature. During my talk I will present these observations, discuss general properties of detected structures and of underlying magnetic fields.

## Charlotte Sobey: Precise LOFAR observations of Rotation Measures towards pulsars

New precise LOFAR rotation measures towards pulsars: I will present some of the latest results from the LOFAR Cycle 0 census observations of 200 pulsars away from the Galactic plane. So far this has resulted in precise rotation measures towards 128 pulsars, 57 of which have not been measured before, and the measurement precision for the others is much improved. This work will provide more accurate measurements for reconstructing the three-dimensipnal Galactic magnetic field, and other interesting studies.

## Jana Koehler: Observing large-scale structure of the entire northern sky by using TBB data from a LOFAR single station

## Valentina Vacca: Statistical methods for the analysis of rotation measure grids in large-scale structures

To better understand cosmic magnetism, a detailed knowledge of magnetic fields in the large-scale structure of the Universe is crucial. Constraining the magnetic field strength and structure in filaments, voids, sheets, before it is affected by cluster formation processes, should allow to discriminate between different scenarios of magnetic field formation and evolution. We propose a new statistical approach to study magnetic fields on large scales with the rotation measure grid data that will be obtained with the new generation of radio interferometers.

## Marta Alves: The LOFAR view of Massive Star Formation

Massive star formation is a very important phenomenon in the Galaxy due to its impact on the interstellar medium (ISM). In particular, the strong ionizing power of massive stars creates HII regions that eventually expand, sweeping up the surrounding ISM into a shell of neutral and dense material. This process must naturally affect the magnetic field that is anchored to interstellar matter. We have derived an analytical solution for the magnetic field in such a spherical bubble-shell structure, assumed to evolve from an initially uniform configuration following the expansion of ionized gas and the formation of a shell of swept-up ISM. We apply the model to the Rosette Nebula, where dust polarized emission data from Planck and radio rotation measures are used to constrain both the direction and strength of the magnetic field. This represents the first joint analysis and modelling of radio and submillimetre polarization observations towards a massive star forming region, paving the way for a better understanding of the effects of stellar feedback on the Galactic magnetic field.

## Marco Iacobelli: Experiences in LOFAR HBA processing

A summary about the progresses of processing of LOFAR HBA data of 3 different MKSP related science topics as well as some preliminary results are presented.

## George Heald: NGC 5775

I will give some background on what's already known about the galaxy and show initial LOFAR imaging results, along with new VLA data that will be used to compare with the LOFAR data.