LOFAR

International LOFAR Telescope

The International LOFAR Telescope (ILT) is a transformational radio telescope operating at the lowest frequencies accessible from the Earth's surface and a pan-European collaborative facility, led by ASTRON.

LOFAR is optimised to work at radio frequencies of 10 to 90 MHz and 110 to 240 MHz, opening up these relatively unexplored windows on the universe for astronomers.

Key science areas
Astronomers have been closely involved in the design of LOFAR to ensure that the telescope is optimally configured to address some of the most important questions in modern astronomy and astrophysics. These topics include:

- The Epoch of Reionisation
- Extragalactic surveys
- Transients and pulsars
- Cosmic rays
- Solar and space environment
- Cosmic magnetism

Proposal allocations
Observing, processing, and/or parallel data use, in part following national interests, and in part following Open Time based purely on science merit to any group in any area of astrophysics. For more information on proposal submission, please visit:
https://bit.ly/3OF2qCg

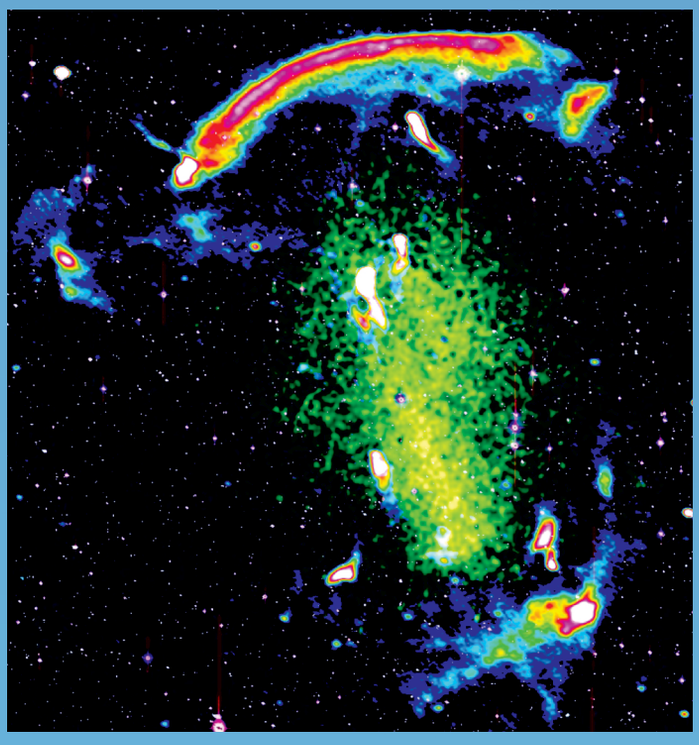
Capabilities
LOFAR combines thousands of dipole receivers with powerful digital signal processing, long distance data transfers, high-performance computing and Petabyte-scale data storage. Through its unique phased-array design, LOFAR has a huge instantaneous sky coverage, the capacity of simultaneous multi-pointing, excellent sensitivity and transient high time-resolution data buffering.

Some specifications:
- Field of View - 2.0 - 40.0 degrees (FWHM);
- Spatial resolution - 0.2 - 3.0 arcsec (maximum).
- Max Time resolution – 5 ns

For detailed technical information, please visit:
https://bit.ly/3Vr88d9

Configuration
LOFAR is configured in geographically distinct antenna fields, or Stations. There are 24 stations concentrated in a 2 km core area near Exloo (North East-Netherlands), 14 stations in a ~100 km area around the core in the Netherlands. 13 international stations (6 DE, 3 PL, 1 FR, 1 SE, 1 UK, 1 IE, 1 LT) in an 1,800 km area in Europe.

Each station consists of a low-band phased array of 96 dipoles observing at 10-90 MHz, and a high-band phased array of either 48 or 96 4x4 dipole antenna "tiles" observing at 110-240 MHz. Depending on the station, individual antenna fields are between 30 and 80 m across.



A high dynamic image of the 'sausage cluster' field observed wth the LOFAR HBA antennas at 150 MHz. It shows two opposite giant radio relics (in rainbow colours) which were created through galaxy clusters mergers. The collisions also heat up the intra-cluster gas to extremely hot plasma capable of emtiing X-rays (Chandra data by Ogrean et al. 2014, in green).
The optical background (Subaru & CHFT data by Stroe et al. 2015, Jee et al. 2015) shows light from galaxies and stars belonging to the Galaxy.
Image credits: Duy Hoang - Leiden University, Tim Shimwell - Leiden University, Andra Stroe - ESO, Reinout van Weeren - Harvard and Huub Röttgering - Leiden University for the LOFAR survey team.

ASTRON
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