Contents

Call for proposals – Deadline October 4, 2018, UT 15:00

by Alex Kraus

Observing proposals are invited for the Effelsberg 100-meter Radio Telescope of the Max Planck Institute for Radio Astronomy (MPIfR).

The Effelsberg telescope is one of the World's largest fully steerable instruments. This extreme-precision antenna is used exclusively for research in radio astronomy, both as a stand-alone instrument as well as for Very Long Baseline Interferometry (VLBI) experiments.

Access to the telescope is open to all qualified astronomers. Use of the instrument by scientists from outside the MPIfR is strongly encouraged. The institute can provide support and advice on project preparation, observation, and data analysis.
The directors of the institute make observing time available to applicants based on the recommendations of the Program Committee for Effelsberg (PKE), which judges the scientific merit (and technical feasibility) of the observing requests.

Information about the telescope, its receivers and backends and the Program Committee can be found at https://www.mpifr-bonn.mpg.de/effelsberg/astronomers (potential observers are especially encouraged to visit the wiki pages!).

Observing modes

Possible observing modes include spectral line, continuum, and pulsar observations as well as VLBI. Available backends are several FFT spectrometers (with up to 65536 channels per subband/polarization), a digital continuum backend, a number of polarimeters, several pulsar systems (coherent and incoherent dedispersion), and two VLBI terminals (dBBC and RDBE type with MK5 recorders).

Receiving systems cover the frequency range from 0.3 to 96 GHz. The actual availability of the receivers depends on technical circumstances and proposal pressure. For a description of the receivers see the web pages.

Please note, that observing proposals for the new Phased-Array-Feed cannot yet accepted – the system is still being commissioned. The new 7mm receiver, however, is full usable.

How to submit

Applicants should use the NorthStar proposal tool for preparation and submission of their observing requests. North Star is reachable at https://northstar.mpifr-bonn.mpg.de .

For VLBI proposals special rules apply. For proposals which request Effelsberg as part of the European VLBI Network (EVN) see: http://www.evlbi.org/proposals/ .

Information on proposals for the Global mm-VLBI network can be found at http://www3.mpifr-bonn.mpg.de/div/vlbi/globalmm/index.html .

Other proposals which ask for Effelsberg plus (an)other antenna(s) should be submitted twice, one to the MPIfR and a second to the institute(s) operating the other telescope(s) (eg. to NRAO for the VLBA).

After October, the next deadline will be Feb 4, 2019, 15:00 UT.

RadioNet Transnational Access Programme

by Alex Kraus

RadioNet (http://www.radionet-org.eu) includes a coherent set of Transnational Access (TA) programs aimed at significantly improving the access of European astronomers to the major radio astronomical infrastructures that exist in, or are owned and run by, European organizations.

Astronomers who are based in the EU and the Associated States but are not affiliated to a German astronomical institute, may also receive additional aid from the Transnational Access (TA) Program of 'RadioNet'. This will entail free access to the telescope, as well as financial support of travel and accommodation expenses for one of the proposal team members to visit the Effelsberg telescope for observations.

The Transnational Access program is one of the activities of "RadioNet“, an Integrated Infrastructure Initiative (I3) funded under the ECs Framework Program Horizon2020, that has pulled together all of Europe's leading astronomy facilities to produce a focused, coherent and integrated project that will significantly enhance the quality and quantity of science performed by European astronomers.

One - in exceptional cases more - scientists who are going to Effelsberg for observations can be supported, if the User Group Leader (i.e., the PI - a User Group is a team of one or more researchers) and the majority of the users work in (a) country(ies) other than the country where the installation is located. Only user groups that are allowed to disseminate the results they have generated under this program may benefit from the access.

After completion of their observations, TNA supported scientists are required to submit their feedback through the TNA web pages.

The new Effelsberg Q-band (33 GHz to 50 GHz) receiver

by Uwe Bach

A new dual horn receiver was installed in the secondary focus of the 100m Effelsberg telescope on March 21st, 2018 (Figure 1, 0.7 cm). It is a broadband system around a wavelength of 7mm, that covers a range of 33 to 50 GHz using tunable synthesizers and an IF bandwidth of 2.5 GHz. The receiver has 2 horns separated by 110 arcsec in azimuth and each horn provides 4 IF channels (LCP/RCP and 2 x 2.5 GHz, lower and upper sideband) covering a total bandwidth of 5 GHz at each polarization. The IF is distributed via optical fibers and each channel is connected to a total power continuum backend and a FFT spectrometer.

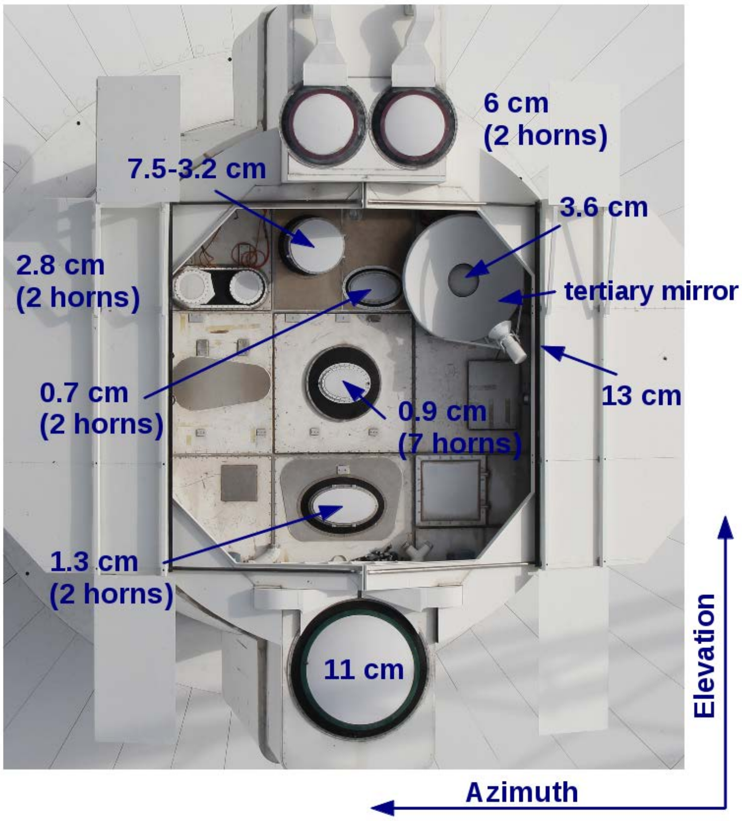


Figure 1: Top view onto the secondary focus cabin equipped with 9 receivers. The new Q-band receiver (labeled as 0.7 cm) is located close to the tertiary mirror of the geodetic SX system.

An IF bandwidth of 4 GHz is available for broadband VLBI observations and for high resolution spectroscopy observations, a narrow 300 MHz IF can be selected. The FFT spectrometer provides 64k channels per IF which corresponds to a frequency resolution of 38.2 kHz/ch using the full 2.5 GHz of bandwidth and 4.6 kHz/ch in the 300 MHz narrowband mode. This corresponds to a velocity resolution of about 0.266 km/s/ch (2.5 GHz) and 0.032 km/s/ch (300 MHz) at 43 GHz.

Test observations showed an overall very good performance. With a system temperature ranging between 70 and 100 K over the band, the SEFD is about two times better than with the old receiver and the covered frequency range five times wider. The SEFD ranges from about 100 Jy at 35 GHz to 150 Jy at 46 GHz (more details about the calibration parameters can be found on the receiver pages in the Effelsberg Wiki). The second horn allows to use the receiver in beam-switch mode to compensate for weather effects. Later, also “ON-ON” position switched observations for spectroscopy will be implemented to reduce the observing time.

Examples for continuum cross-scans, a continuum map of Cyg A and a SiO maser line are given in Figure 2. The cross-scan and also the side-lobes around the hot-spots of Cygnus A look quite symmetric which shows that the position and focus of the receiver in the secondary focus are well adjusted. The narrow SiO line on R Cas at 43.122 GHz is a zoom into the full 2.5 GHz band at low resolution. The baseline over the whole 2.5 GHz is rather flat. The receiver is now available for all scientific observations and is included in the current call for proposals.

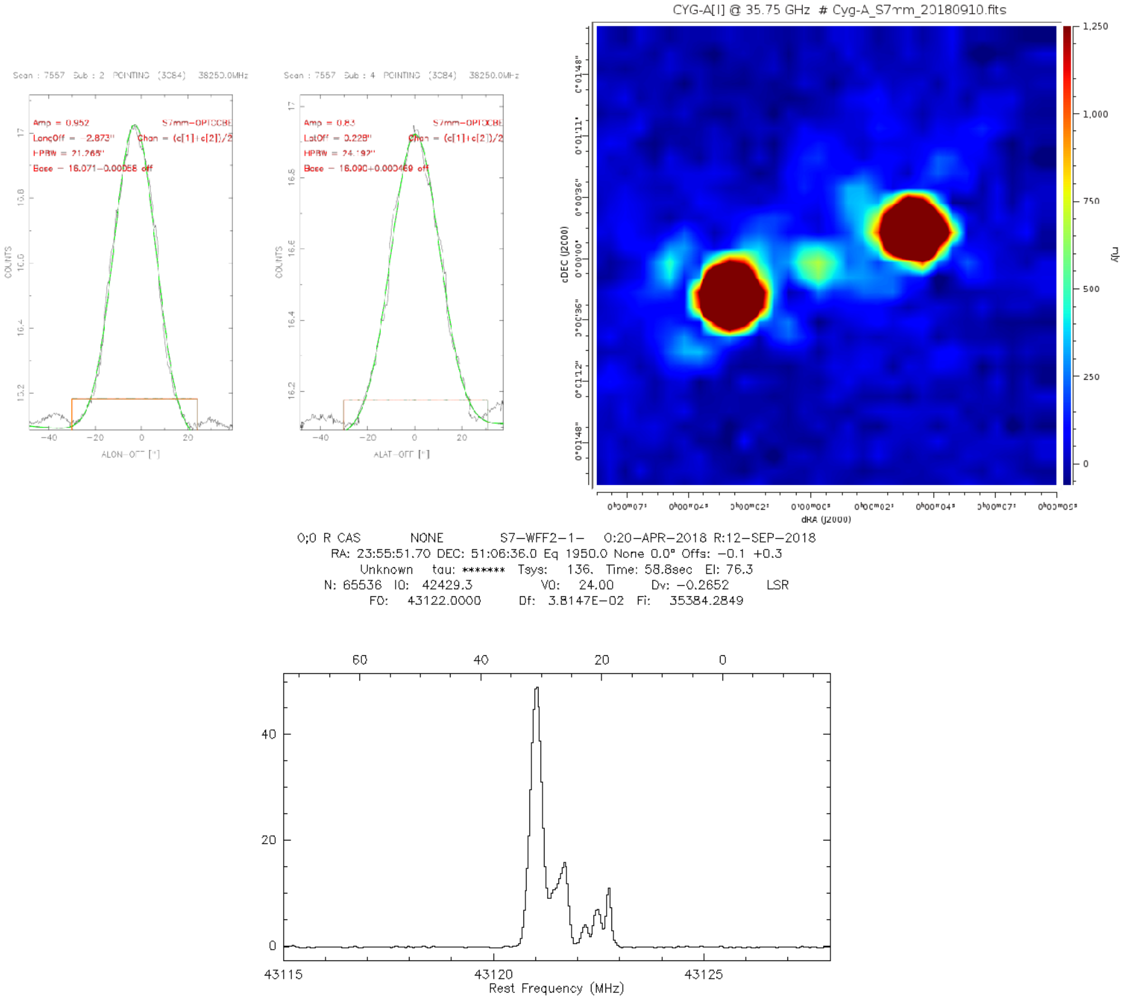
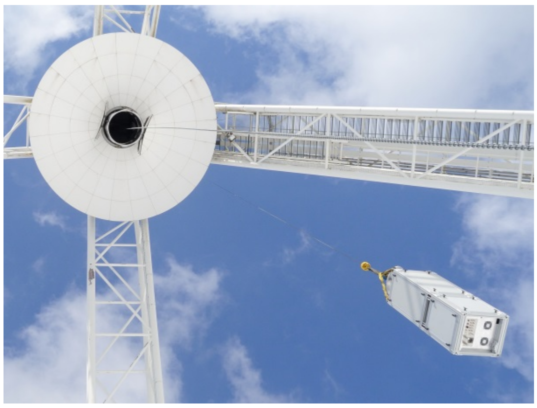


Figure 2: A continuum cross-scan in Azimuth and Elevation on 3C84 at 38.25 GHz (top, left), a continuum map of Cygnus A at 35.75 GHz (top,right), and the SiO maser line on R Cas at 43.122 GHz (bottom).



The receiver in the lab and during installation in the telescope.
Photos: Sener Türk/MPIfR

Astronomy Walks in Effelsberg – how Sirius is coming to Chile

by Norbert Junkes

The 100-m radio telescope of the Max Planck Institute for Radio Astronomy (MPIfR) is located in a valley near Bad Münstereifel-Effelsberg about 40 kilometers southwest of Bonn in the Eifel area. Three astronomical trails in the surroundings of the observatory, named "Planetary Walk", "Milky Way Walk" and "Galaxy Walk" illustrate the complete cosmic distance scale from nearby planets to distant galaxies. The connection between two of them, the Planetary Walk and the Milky Way Walk, is established by the common target station "Sirius". In the scale of the Milky Way Walk, Sirius and our sun are neighbouring stations only 90 cm apart. In the scale of the Planetary Walk, the real distance of 8.6 light years between sun and Sirius amounts to 11,000 km, corresponding to the distance between two of MPIfR's radio telescopes, the 100-m Effelsberg telescope in Germany and the 12-m APEX submillimeter telescope in Chile.

Figure 1: The 100-m radio telescope seen from the courtyard of the visitors' pavilion. The yellow ball marks the station "Sun" of the Effelsberg Planetary Walk. This walk includes 11 stations in total: the sun, 8 planets, dwarf planet Pluto and the nearby star Sirius as transatlantic extension.

Photo: Norbert Junkes/MPIfR

Planet trails (in German: "Planetenwege") are a nice way to illustrate cosmic distances and sizes within our solar system. They usually consist of nine or ten stations: the sun and eight planets, sometimes also including the dwarf planet Pluto. At the widely used scale of 1 : 1 billion the trail has a total length of almost 6 kilometers (distance between sun and Pluto). The sun scales to a diameter of 1.4 meters, and the Earth to 1.3 cm in a distance of 150 meters from the sun.

The Planetary Walk at the Effelsberg Radio Observatory is a bit smaller in size. Scaled 1 : 7.7 billion it covers the walking distance of about 800 meters from the parking area to the visitors' pavilion where talks about radio astronomy and the telescope for groups of visitors are taking place. It starts with the dwarf planet Pluto at the parking lot and continues from there to the inner solar system – the rocky planets between Mars and Mercury and the sun itself can all be found at the courtyard of the visitors' pavilion (Figure 1).

Two additional walks, the Milky Way Walk and the Galaxy Walk, are extending the cosmic distance scale far beyond the solar system. The Milky Way Walk covers a total distance of 4 kilometers from the village Burgsahr in the nearby Sahrbach valley to a viewing spot immediately in front of the giant dish of the Effelsberg telescope. At a scale of 1 : 10^{17} (1 : 100 quadrillion) this corresponds to 40,000 light years through our galaxy. The Milky Way Walk includes a total of 18 stations from the outer regions along the sun to the Galactic centre at a distance of 25,000 light years from the sun.

The Galaxy Walk covers the truly large distances in the Universe. It has a total length of 2.6 km, starting in the forest behind the Effelsberg radio telescope and leading to a nearby hut (Martinshütte: the “hut at the edge of the Universe”). At a scale of 1 : 5 x 10^{22} (1 : 50 sextillions) it includes a total of 14 stations, the most distant one with a light travel time of 12.85 billion years. In other words: we observe light from that distant galaxy (named J1148+5251) coming from a time less than 1 billion years after the formation of the Universe.

In order to connect the three astronomy trails at Effelsberg there are two target stations included in two of the trails. The station “Andromeda Galaxy M31” is contained in both, Milky Way Walk and Galaxy Walk. It is the closest large-scale spiral galaxy, a twin of our Milky Way at a distance of 2.5 million light years. For the Galaxy Walk that scales to 50 centimeters; Milky Way and Andromeda galaxy are the first two stations only 50 cm apart. At the scale of the Milky Way Walk, however, it corresponds to a distance of 250 kilometers.

The station “Andromeda Galaxy” is mounted at the “Haus der Astronomie” in Heidelberg, 250 km away from Effelsberg. This house is indeed shaped like a spiral galaxy, contains a 1 : 100 scale model of the Effelsberg telescope in its interior and the plaque “M 31” of the Effelsberg Milky Way Walk at the main entrance.

The connecting element between Planetary Walk and Milky Way Walk will be Sirius, the brightest star in the night sky. Sirius is a nearby star at a distance of only 8.6 light years from the sun. Both stations (Sun and Sirius) can be found on the Milky Way Walk: close to the village Binzenbach in the forest, the two plaques are just 90 centimeters apart.

For the Planetary Walk it is a different story: the distance of about 9 light years to Sirius scales to 11,000 kilometers! At the same scale, the dwarf planet Pluto is less than 800 meters away from the Sun. For the space probe Voyager 1, the most distant device built by mankind, it is less than 3 km in scale, and even for the nearest star, Proxima Centauri, it is already more than 5000 km!

Coincidence by chance: the required value of 11,000 km for Sirius nicely meets the distance between two radio telescopes of the Max Planck Institute for Radio Astronomy, the 100-m radio telescope at Effelsberg and the APEX telescope in the Atacama desert in Chile which is jointly run by the MPIfR, the European Southern Observatory ESO and the Swedish Onsala Observatory.

The station “Sirius” of the Planetary Walk is mounted directly at the APEX site on the Chajnantor plateau 5100 m above sea level in the Atacama desert (Figure 2). Sirius is the brightest star in the night sky, and it is visible from both sites, Effelsberg in Germany as well as APEX in Chile.

Since there is no general access to the APEX telescope on Chajnantor, Sirius is also presented in the nearby village San Pedro de Atacama, 2500 m above sea level. The San Pedro office of Alain Maury's San Pedro de Atacama Celestial Explorations (SPACE) on Caracoles 400-2 presents the plaque in three different languages (Spanish, English and German).

Figure 2: The Atacama Pathfinder Experiment (APEX) at the Chajnantor plateau in Northern Chile, 5100 m above sea level. The linear distance of 11,000 km between APEX and the Effelsberg 100-m radio telescope in Germany nicely corresponds to the distance of the nearby star Sirius in the scale of the Effelsberg Planetary Walk.

Photo: Norbert Junkes/MPIfR

Who is Who in Effelsberg?: Zegeye Mekasha Kidane

Photo: Norbert Tacken

I was born and raised in a town called Wolkite in southern western Ethiopia which is located around 134 km from the capital city of Ethiopia – Addis Ababa. This town has a latitude and longitude of 8°17′N 37°47′E and an elevation between 1910 and 1935 meters above sea level and a total population of around 30,000.

I completed my high school in Goro Comprehensive Secondary School of this town and joined Addis Ababa University of natural science Institute. After one year of study I joined Defence Engineering College in Debre Zeyit town which is located around 45 km from Addis Abeba and started to study electrical engineering specialization in electronics communication technology. After completing my study I started my new era by joining the staff member of electronics communication department in Defence Engineering College as technical assistant. I gained a good experience in electronics, high and low frequency commercial and military receivers and transmitters, radar technique, microcontroller and different software packages. I got also the opportunity to work in research and development department and participated in different military projects. I served my native county as from ordinary soldier till to military rank of second lieutenant. I worked there from 2000 till 2006.

My interest in electronics was started from childhood. When I was in the third class, I opened my father's radio receiver and tried to understand how the tuning part works. Since that time I interested to learn and know different electronics circuitries.

In 2006 I came to Germany for further education. I started to learn the language, culture, politics technology and values of stoic people who strive for perfectionism and precision in all aspects. At first people attitude may seem unfriendly, but there is a keen sense of community and social conscience, and a desire to belong and easy to integrate.

I started my further study in 2008 and studied communication engineering in the first 4 years here in Germany and continued for specialization in communication systems and networking at TH Köln and Hochschule Bonn-Rhein-Sieg. I completed my furthered education in 2015 and directly started my job as communication electronics in different advanced Industries in Germany. In parallel to my job I was looking for a new job which coincides to my current qualification. I am a father of three children (8, 6 and 3) years old. In parallel to my study I needed to manage and guide the family. At this position I want to give my thanks to my wife for her help and love during my study. Without her help it would be very difficult to accomplish and reach to my dream.

In July 2017 I joined Max-Planck Institute for Radio Astronomy in Effelsberg. Since then I am working as system engineer under System group. It is really a good opportunity and successes of my education to join such dynamic, well-educated and experienced, hard worker and cooperative colleagues. I am enjoying the works with friendly colleagues and getting new knowledge in the field of Radio Astronomy. I am very glad of getting the chance for applying my technical knowledge and simultaneously observing the effects of my contribution on the system of Radio astronomy devices.

"Education is the most powerful weapon which you can use to change the world." Nelson Mandela.

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