

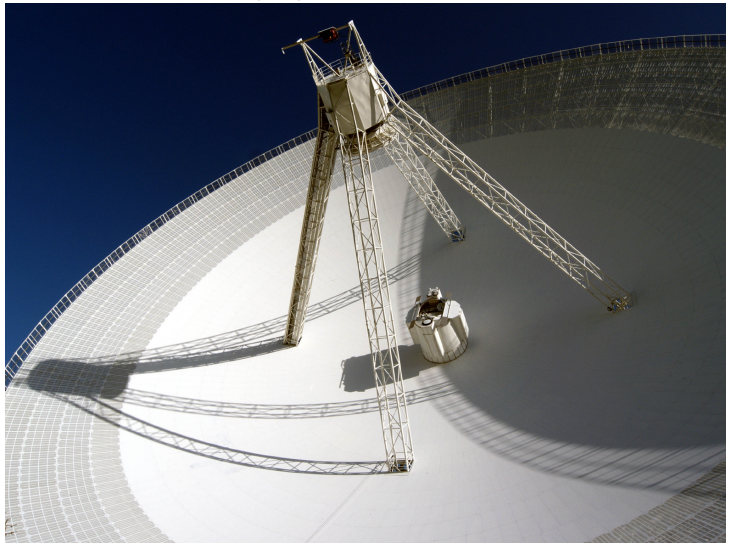
# Effelsberg User Guide

## Introduction

The 100-m radio telescope of the Max-Planck-Institut für Radioastronomie (MPIfR) is located in a protected valley near Bad Münstereifel-Effelsberg. It is one of the two largest fully steerable single-dish radio telescopes in the world and a unique high-frequency radio telescope in Europe. The telescope can be used to observe radio emission from celestial objects in a wavelength range from 90 cm (300 MHz) down to 3.5 mm (90 GHz).

The combination of the high surface accuracy of the reflector (holographic measurements showed a mean

deviation from the ideal parabolic form of  $\leq 0.55$  mm rms) and the construction principle of “homologous distortion” (i.e., the reflector in any tilted position has a parabolic shape with a well-defined, but shifted, focal point) enables very sensitive observations at unprecedented high frequencies for such a large telescope.



The wide variety of observations with the 100-m radio telescope is made possible by a large number of receivers which are located either in the primary or in the secondary focus. Together with a number of backends dedicated to different observing modes they provide excellent observing conditions for spectroscopic observations (atomic and molecular transitions over a wide frequency range), for high time-resolution measurements (pulsar observations), mapping of extended areas of the sky, for polarimetry and participation in a number of interferometry networks (such as mm-VLBI, EVN, and Global VLBI).

This *user guide* should help you in proposing, preparing, executing and analyzing observing runs at the 100-m telescope. It is continuously updated - contributions come from a number of colleagues, mainly U. Bach (general, observations, software), R. Beck (continuum mapping), H. Hafok (software, spectroscopy) A. Kraus (general), M. Krause (continuum mapping), and B. Winkel (spectroscopy). In case of additional questions, please do not hesitate to contact us directly.

We are looking forward to meeting you personally in Effelsberg! Good luck with your observations,

Alex Kraus

(on behalf of the staff at the observatory)

## Current Status

[Current Status of the observational system](#)

## Observer's Feedback

Please report any problem which you encountered during your observation by email to **eff-support[at]mpifr-bonn.mpg.de** (Please exchange [at] by the '@' to send an email to the Effelsberg support team).

When doing so, please give: (1) your name, (2) date and time of the observation, (3) used receiver, (4) a clear description of the problem. If possible, provide some figures. Thanks!

## Description of the Antenna, Receivers and Backends

- [Antenna](#)
- [Receiver and calibration parameters for the Effelsberg 100-m Telescope \(new\)](#)
- [Backends](#)

## How to get observing time

- [From the Proposal to Observations](#)

### Acknowledge the 100-meter telescope

*For a publication which made use of data observed with the 100-meter telescope, please use the following acknowledgment: **Based [Partly based] on observations with the 100-m telescope of the MPIfR (Max-Planck-Institut für Radioastronomie) at Effelsberg.***

## Observing with Effelsberg

- [The "OBSINP" observing software](#)
  - [Preparing your catalog](#)
  - [Flux density measurements](#)
  - [Continuum observations](#)
  - [Spectroscopy](#)
  - [Pulsar observations](#)
- [Continuum observations \(On-the-fly mapping\)](#)
- [Recommendations for VLBI experiments](#)
- [Spectroscopic observations](#)
  - [Available observing modes](#)
  - [Configuring the XFFTS \(standard spectroscopy backend\)](#)

- [Velocity convention](#)
- [About ghosts: Class and the "FOLD" command](#)
- [ADC interleaving and the XFFTS](#)
- [vLSR \(Doppler\) correction issues for large bandwidth observations](#)
- [MultiFiBa: setting-up the correct signal path for Spectroscopy, VLBI, and Pulsar observations](#)
- [Editing/Visualizing source catalogs: "catalogME"](#)
- [Online plotter](#)
- [Observation logger](#)
- [Data storage and archive](#)
- [Remote Observing](#)
- [Guest Network](#)

## Data reduction of Effelsberg observations

- [Using the Toolbox to inspect cross-scans](#)
- [Reduction of pointed flux density measurements](#)
- [New automated data reduction pipeline for continuum cross-scan observations](#)
- [Reduction of on-the-fly maps \(Continuum\)](#)
- [Reduction of spectroscopic measurements](#)
- [Semi-automatic reduction of spectroscopic measurements - a cookbook](#)
- [For the reduction of Pulsar measurements, please contact the pulsar group in Bonn](#)
- [Further material \(papers, tech memos, etc.\)](#)

## Tips and Tricks

- [Optimal reference position for On-Off measurements](#)
- [Using the Effelsberg Database](#)
- [Reading in FFTS Raw data \(binary format\) using Python](#)
- [Calibrators and their polarization](#)

## Logistics

- [Hints for observers coming from abroad to Effelsberg](#)

## Tutorials and Cookbooks

- [A typical continuum observing session](#)
- [A typical spectroscopy session](#)
- [The Effelsberg 4m telescope, a primer](#)

## FAQ

- [Frequently Asked Questions](#)

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