



M2FINDERS POSTDOCTORAL POSITIONS (m/f/x) IN RADIO ASTRONOMY AT THE MPIfR IN BONN, GERMANY

The Max Planck Institute for Radio Astronomy (MPIfR) is the leading radio astronomical institute in Germany. It operates the [100-m radio telescope in Effelsberg](#) (as a single telescope and as an element of the European VLBI Network - [EVN](#) and the Global Millimetre VLBI Array - [GMVA](#)), the LOFAR DE1 station, which is part of the [International LOFAR Telescope](#), the [APEX](#) telescope in Chile (also an element of the Event Horizon Telescope - [EHT](#)), and a state-of-the-art VLBI (Very Long Baseline Interferometry) correlator. The department of Radio Astronomy/VLBI, led by Prof. Dr. J. A. Zensus, has a broad research portfolio, with a focus on compact extragalactic objects (AGN) and their broad-band emission, through very-high-resolution studies with mm- and space-VLBI imaging and blazar monitoring.

The MPIfR is recruiting up to **three postdoctoral researchers in Radio Astronomy** to join the project M2FINDERS (Mapping Magnetic Fields with INterferometry Down to Event hoRizon Scales). **M2FINDERS** is led by Prof. Zensus as the prime investigator, with funding by the European Research Council (grant agreement No 101018682). The project will measure and model the three-dimensional morphology of the magnetic field in the immediate vicinity of supermassive black holes. The primary goal is to use VLBI observations to measure the strength and distribution of the magnetic field within 10000 gravitational radii of the black hole and to use these measurements as a probe of physical conditions on the event horizon scale. The project has three main objectives:

1. *Observational studies of the magnetic fields in the vicinity of supermassive black holes:* Performing multifrequency polarimetric VLBI observations of a sample of radio-loud AGN at 15/22/43/86 GHz with the Very Long Baseline Array (VLBA) and GMVA. Application of the derived linearly polarised emission: Faraday rotation measure, core shift, and turnover frequency/flux density distribution for mapping the structure of the magnetic field.
2. *Development of advanced methods for interferometric imaging:* Development of algorithms for VLBI polarization calibration and imaging applied to GMVA observations at 86 GHz and EHT observations at 230 GHz. Implementation of frequency phase transfer (FPT) and source-frequency phase referencing (SFPR) techniques at the Effelsberg 100-m telescope for improving the dynamic range and astrometric accuracy of high-frequency VLBI observations.
3. *Reconstruction of the 3D structure of the magnetic field near supermassive black holes:* Development of methods for combining the polarisation and turnover frequency images for obtaining maps of the three-dimensional distributions of the magnetic field. Extension of the method for estimating the magnetic field strength from core shift to include the collimation and acceleration of the flow into the modelling framework.

We are looking for researchers with scientific interests, qualification and skills matching one or more of these objectives. Experience in radio interferometry techniques and VLBI is desired.

The [International Max Planck Research School for Astronomy and Astrophysics \(IMPRS\)](#) offers the opportunity for joint research with PhD students, their supervision, and teaching in the program within the M2FINDERS project.

Interested and qualified individuals are encouraged to apply by submitting their curriculum vitae, their list of publications, and a research motivation letter addressing at least one of the M2FINDERS work areas (1-3). Applicants should also arrange for three letters of recommendation to be sent to the MPIfR application portal under the address given below by **September 1, 2021**.

The initial appointments are for two years with the possibility of extension after review. The anticipated start date is November 2021 or later. Remuneration is within the framework of the German wage agreement for the public service (TVöD-Bund) in level 13.

The Max Planck Society is committed to increasing the number of individuals with disabilities in its workforce and therefore encourages applications from such qualified individuals. Furthermore, the Max Planck Society seeks to increase the number of women in areas where they are underrepresented and therefore explicitly encourages women to apply.

Please submit your application at

https://s-lotus.gwdg.de/mpg/mbra/perso/mpifr_bonn_sci_009.nsf/application

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