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The Next Steps (A4)
SETI 1: SETI Science and Technology (1)

Author: Dr. Maura Pilia
INAF - Istituto Nazionale di AstroFisica, Italy

Dr. Andrea Melis
INAF - Istituto Nazionale di AstroFisica, Italy

SETI PROGRAM AT THE SARDINIA RADIO TELESCOPE

Abstract

The Sardinia Radio Telescope (SRT) is a 64-m fully-steerable antenna, which is located in Sardinia, Italy. SRT currently observes at frequencies between 300 MHz and 26 GHz and it recently underwent a major upgrade which will extend the range of observable frequencies up to 100 GHz. Commissioning of the new receivers is now underway.

SRT started a collaboration with the Breakthrough Listen (BL) Program as an auxiliary facility for Searches for ExtraTerrestrial Intelligence (SETI). Together with the regular SETI scopes, this allows us also the possibility to perform parallel piggy-back observations of astrophysical transient sources (e.g. pulsars and fast radio bursts).

The first SETI observations at SRT were performed in 2020. They were aimed towards two groups of targets with the purpose to find evidence of artificial transmitters from putative intelligent civilizations. We observed the Galactic Center at 7 and, for the first time, 22 GHz. Moreover, SRT is one of the important partner facilities for following up potential exoplanet candidates from the TESS program in collaboration with the BL team. They were also observed at 7 and 22 GHz.

A summer studentship program was activated in the framework of the collaboration starting in 2022. Both sets of observations were analysed, with an important contribution by the students, using BL open source software TurboSETI which looks for Doppler drifts in the incoming signals. The findings with TurboSETI were cross-checked with a newer software, HyperSETI, so as to also validate the different searching methods. Thirdly, a new method developed in-house, based on the Karhunen-Loeve Transform (KLT) is being tested for preliminary denoising of the data.

We describe the preparatory and ongoing activities: we discuss the commissioning of the system and the scientific validation, we present the first results of the SETI searches and, finally, we outline the future perspectives of the collaboration in Italy.