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SETI THROUGH FUTURE DEVELOPMENTS OF THE PARKES RADIO TELESCOPE

Abstract

The Parkes radio telescope, known affectionately as ‘The Dish’, is located ~380 km west of Sydney, Australia, and has been in operation since 1961. It is a 64-metre parabolic antenna, with receiver systems capable of observing from 700-MHz to 26 GHz with bandwidths up to a GHz, and it is part of the CSIRO Australia Telescope National Facility (ATNF). The current receiver suite includes the 13-beam 20cm multibeam receiver, which enabled unprecedented surveys of atomic hydrogen in the Southern sky, helped discovered approximately half the known population of pulsars, as well as in more recent years discovering the first Fast Radio Burst. The Parkes Radio Telescope was recognised as a Square Kilometre Array (SKA) Pathfinder in 2016, on the basis of Phased Array and Wideband Feed technology development, and a five year agreement was made with the Breakthrough Prize Foundation for the Parkes telescope to search for Extraterrestrial Intelligence. This officially commenced in November 2016, with 25% of the telescope time dedicated to this project, with a purpose built backend installed at the telescope. The data obtained in this project will be open access. The search for intelligent life elsewhere in the universe is one of the key science drivers of the SKA, and this agreement, combined with the state-of-the-art technology developments, will place Parkes at the leading edge of this research. I will present a summary of the current status of the capabilities of the Parkes Radio Telescope in the context of SETI activities, and outline the planned developments for the coming years. This includes exploring the technologies appropriate for the SKA and efficient SETI searches: an Ultra-Wideband single pixel feed operating from 700 MHz to 4 GHz, and a cryogenically cooled Phased Array Feed operating in the region of 700 MHz to 2 GHz.