# Interference at the Molonglo Observatory Synthesis Telescope

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## ABSTRACT

The Molonglo Observatory Synthesis Telescope (MOST), near Canberra, Australia consists of an East-West line-feed array at the focus of two 778 m long cylindrical paraboloids (see, for example, [1]). As part of Square Kilometre Array (SKA) prototyping, the MOST is currently undergoing a series of upgrades which will continue over the next few years to test a number of key SKA issues. As part of the upgrade to SKAMP, the Square Kilometre Array Molonglo Prototype, an investigation of the Radio Frequency Interference (RFI) from some probable future interfering sources has been initiated, and a test range has been set up to measure the actual RFI levels that can be expected from the sites. The main initial objective of the project is to measure the effect that specific sources of RFI will have on SKAMP. This is achieved by emitting noise from radio transmitters at the source locations and measuring the power levels received at the telescope. From this the pathloss between the transmitters and the telescope and the variation in the pathloss under a variety of environmental conditions can be measured and compared with propagation models of the intervening terrain, and active interference mitigation can be applied to the collected data to assess the achievable levels of RFI suppression and the overall impact of RFI on SKAMP.

In this paper a description of the test range and recording equipment is given and some preliminary interference mitigation results are discussed. The upgraded instrument will consist of a digital correlator with inputs from 88 receivers on the line feed, as well as extra inputs for interference reference antennas. This set-up is especially suited to the interference mitigation technique known as post-correlation cancelling, [2], in which the cross-power spectra between the cosmic line-feed signals and the interference reference signals are used to determine and cancel the RFI power in the line-feed cross-power spectra. The results are very encouraging, with the RFI being suppressed to below the noise level.

## REFERENCES

[1] J. G. Robertson, "The MOST and Other Radio Telescopes", *Australian Journal of Physics*, vol. 44, pp. 729-742, 1991.

[2] F. H. Briggs, J. F. Bell and M. J. Kesteven, "Removing Radio Interference from Contaminated Astronomical Spectra Using an Independent Reference Signal and Closure Relations," *Astronomical Journal*, vol. 120, pp. 3351-3361, 2000.