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LUNASKA lunar Cherenkov observations: signal processing strategies

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The LUNASKA project employs the lunar Cherenkov technique, using the Moon as a detector volume to search for ultra-high energy particles. The radio-frequency pulse from a shower induced by one of these particles in the lunar regolith may be detected by a terrestrial radio telescope; however, it is distorted en route by dispersion in the ionosphere, as well as by effects within the telescope signal path related to downconversion and sampling. These effects reduce the sensitivity of this technique compared to its theoretical potential, but they can be largely compensated for by intelligent signal processing. We present a description of these effects and the approaches being used to nullify them, as well as latest results from our ongoing observations with the Parkes radio telescope.

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