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Signal Transport System - RF over Fiber and application to upgraded GMRT

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In a Radio Telescope bringing in the noise like radio astronomy signal from an antenna located at a distance from signal processing station fiber optic systems provide many advantages over lossy RF cables. The digital fiber optical links gets challenging when it comes to radio frequency interference and clock and timing signal synchronizing to a remote system. RF over fiber is a promising signal transport system for a radio telescope with single antenna or an array of antenna by optimizing the various performances of the link to the benefit of radio astronomy receiver. The design techniques, its performance optimization with respect to dynamic range, phase and amplitude stability, the architecture to increase the density of the links in a single fiber and its reliability is discussed with reference to its implementation at upgraded GMRT. Also, it highlights the novel systems designed for phased array antennas and very long-distance links with externally modulated laser-based system.

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