

Wide Band Receiver for FAST

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The receiver and backend constitute one of the most important elements of telescope construction; oftentimes, the performance of the receiver system will be the key factor or limiting factor in the overall telescope performance. In this conference, I will present a wide-band receiver design to be used as part of a science project in China, a Five-hundred-meter-Aperture Spherical radio Telescope (FAST), which is under construction and will be completed by 2016. A low-frequency, wide-band receiver will play a significant role in allowing this telescope to study the evolution of the universe, discover new molecules and pulsars, and make many other significant contributions to research. This receiver is projected to span a range from 70 MHz to 3 GHz, using a 5-GSPS, 10-bit ADC or a 3-GSPS, 12-bit ADC board on a customized FPGA signal processing board. The receiver system will also have a customized RF frontend board to integrate most electronic components (e.g. VCOs, digital switches, digital attenuator, mixers, amplifiers etc.) between feed antenna and ADC. The digital backend design will also be discussed during the conference. We plan to design, test and optimize a relatively complete wide-band receiver system; and prepare for the full FAST telescope implementation. The technique of the wide band receiver development for FAST will benefit not only FAST, but also the other telescope in China, such as Shanghai 65m and Xinjiang 110m telescope and other countries.