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# Instrumentation for the Wideband Submillimeter Array

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The Submillimeter Array was conceived more than 2 decades ago as the world's first submillimeter interferometer capable of sub-arcsecond imaging in the frequency range from 200 to 700 GHz. It began full science operations in 2004 with a suite of double side band SIS mixer receivers operating in the 230, 345, and 690 GHz bands. The 345 and 690 GHz receiver sets were co-polarized and could be used in conjunction with the 230 GHz receiver sets, which were operated in the orthogonal polarization. Each of the receivers had a 2 GHz-wide intermediate frequency, and a purpose-built ASIC correlator combined the signals from the different antenna pairs for a total processed on-sky bandwidth of 2x2x2 GHz.

Incremental improvements to the receivers, coupled with the development and deployment of a new correlator, have resulted in significant improvements in sensitivity, both in terms of receiver noise and on-sky bandwidth, which is currently 2x2x12 GHz since the receivers now provide output across an IF band 12 GHz-wide. However, improvements to much of the instrumentation infrastructure at the observatory site – e.g., receiver coupling optics, cryogenics, signal transmission system – would result in even lower noise and wider bandwidth performance. Two years ago, we began to develop plans for a major upgrade to the SMA – the wSMA. In this presentation, I will discuss these plans and the current status of the wSMA, which will become operational during the next several years.