

The Square Kilometer Array - An Ideal Tool For Bioastronomy

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When it is built by an international consortium, the Square Kilometer Array (SKA) will have a collecting area of one million square meters, cover frequencies from 300 MHz to 20 GHz, with system temperatures $<50^{\circ}\text{K}$, and simultaneously image 100 pencil beams with angular resolution of 0.1 arcsec, over a field of view that is 1 square degree at 1.4 GHz. Progress in astronomy has always depended on forefront instruments with greater resolving power and sensitivity to reach further into the universe, and to detect new kinds of objects with unexpected properties. With a spectral line sensitivity of $0.8 \mu\text{ Jy}$ at the high frequency end ($3 \mu\text{ Jy}$ at 300 MHz), a continuum sensitivity of $0.02 \mu\text{ Jy}$ at 20 GHz ($0.04 \mu\text{ Jy}$ at 300 MHz), a resolution comparable to the Hubble Space Telescope, and a unique multiple beam capability, SKA will view the dawn of galaxy formation and provide precise enough measurements of thermal astrophysical processes to serve as a real physics laboratory. It should help answer many of today's questions in Bioastronomy and surprise us with answers to questions we do not yet know how to ask. It will track the evolution of the biogenic elements, and the evolution of circumstellar disks into planetary systems, and discover planets, including those that may be inhabited by advanced technologies.