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ENHANCING SPECTRAL SENSITIVITY THROUGH INTELLIGENT TARGETING

Abstract

The search for extraterrestrial life is a crucial area of research for scientists as it enables examination of life-sustaining zones in exoplanets. While advanced cameras with single-photon counting sensors have provided data from the visible light spectrum, detecting signals in the mid to far-infrared spectrum remains challenging due to the absence of large area single-photon counting detectors. To increase the chances of detecting life-supporting elements, this paper proposes the integration of multi-wavelength spectrum analysis, advanced detectors, and intelligent targeting. As the development and maintenance of advanced spectral sensors is a significant challenge, we can enhance the spectral sensitivity by the inclusion of advanced materials such as graphene, carbon nanotubes, and quantum dots. Temperature control systems will ensure the optimal functioning. To understand more about the electrical charge of the particles, results from the photoelectron spectrum will be evaluated, thus identifying those elements which facilitate life. Illumination with a narrow laser bandwidth and matched detection bandwidth can minimize Zodiacal light during IR observation. Coverage of the electromagnetic spectrum will necessitate the utilization of radio signals coupled with intelligent targeting that prioritizes stars or regions with evidence of intelligent life. To track technological activity, we will target specific frequencies and use sophisticated algorithms to sift through large amounts of data. Analyzing specific frequencies of distant stars with the help of gravitational lensing can improve the chances of discovering extraterrestrial life.