

43rd SYMPOSIUM ON THE SEARCH FOR EXTRATERRESTRIAL INTELLIGENCE (SETI) – The  
Next Steps (A4)  
SETI 1: SETI Science and Technology (1)

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TERAHERTZ IMAGING SYSTEM FOR SETI AND THE EXPLORATION OF THE BEGINNING OF  
THE UNIVERSE

**Abstract**

Results from the NASA Cosmic Background Explorer (COBE) Diffuse Infrared Background Experiment (DIRBE) and examination of the spectral energy distributions in observable galaxies, indicate that approximately one-half of the total luminosity and 98% of the photons emitted since the Big Bang fall into the terahertz and far-IR. Many vital substances for life such as O<sub>2</sub>, CH, CH<sup>+</sup>, OH<sup>+</sup>, H<sub>2</sub>O, etc. have their key molecular line emissions in terahertz region. Therefore, it is quite significant for human beings to establish a terahertz imaging system to investigate into the deep universe for information of other living creatures and the beginning of the universe.

Produced by Einstein's general theory of relativity, gravitational lenses such as the Sun have offered us gigantic antennas to discover the stories far from our Solar system and long ago from now. However, affected by the Corona of the Sun, the outward deflection due to the coronal plasma counterbalances the inner deflection due to gravity for electromagnetic wave with a critical frequency of 122.361 GHz. So terahertz wave with a frequency higher than 122.361 GHz is a perfect choice for one who's utilizing the Sun as gravitational lens.

In this paper, we have designed a terahertz imaging system with the help of the Sun as gravitational lens to search for extra-terrestrial intelligence and explore the early universe. What's more, a small terahertz imaging system in laboratory has also been established to investigate characteristic terahertz images of different materials in order to get experience and important information for the grand system for spacecraft in the future.