The 220GHz Terahertz Cloud Radar System for Atmosphere Observation

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Abstract—Clouds play an important role in the atmospheric influence on the earth's radiation budget, which is reflected both in some long-term effects of climate change and some short-term effects of sudden meteorological disasters, therefore, Cloud detection becomes more and more important nowadays.

The terahertz cloud profiling radar is an effective tool in weather observations for cloud vertical structure, cloud liquid water and ice water content, etc. In this paper, a 220GHz terahertz cloud profiling radar system for atmosphere remote sensing is designed, according to the detection requirements, system parameters are calculated as well as the system diagram is proposed. Then the prototype of terahertz cloud profiling radar is developed, and atmosphere observation experiments have been carried out outdoors.

The experimental results show that it is available to get atmosphere particles echo using terahertz wave, and the radar system is stable and sensitive capable of providing accurate information for clouds.