

16th IAA SYMPOSIUM ON SPACE DEBRIS (A6)  
Interactive Presentations - 16th IAA SYMPOSIUM ON SPACE DEBRIS (IP)

Author: Mr. Jingting Ma  
CASIC, China, majingting@foxmail.com

Ms. Yue Sun  
Beijing Huahang Radio Measurement Research Institute, China, yuesun\_iop@163.com  
Mr. Zunlong Liu  
Beijing Huahang Radio Measurement Research Institute, China, lzlht35@foxmail.com  
Mr. Gaoliang Li  
Beijing Huahang Radio Measurement Research Institute, China, ligaoliang3@qq.com  
Ms. Qian Tang  
Beijing Huahang Radio Measurement Research Institute, China, yayatq@163.com

QUANTUM ENHANCED LADAR BY SQUEEZED LIGHT FOR SPACE TARGET DETECTION

**Abstract**

The detection of space target plays a vital role space science and development. In optical region, coherent LADAR has been widely used to detect space debris and other small space target due to its advantages in high sensitivity, frequency selectivity, strong directionality, and the ability to get multi-dimensional information. However, as the local oscillator (LO) power of coherent LADAR is increased, the quantum noise power of the LO field becomes the dominant noise source of the detection system, and eventually limit the detection range, achieve standard quantum limit (SQL). In this paper, a novel quantum enhanced coherent LADAR has been designed for space target detection, which combines coherent LADAR technology and quantum technology. By applying quantum squeezed state to LADAR receiver, the SQL can be surpassed, and the resolution and sensitivity of LADAR can be improved significantly. This new scheme open up a possibility to use quantum squeezed light in space observation, such as long-range LADAR and small space target detection.