## **Photon Counting Terahertz Interferometry**

H. Matsuo

National Astronomical Observatory of Japan, Tokyo 181-8588, Japan Contact: h.matsuo@nao.ac.jp, phone +81-422-34-3915

*Abstract*—I have proposed in the 22nd ISSTT symposium in 2011 that a combination of intensity interferometer with photon counting terahertz detector can be a powerful tool for future high angular resolution observation in terahertz frequencies. I name it as Photon Counting Terahertz Interferometry (PCTI). Advantage of PCTI is that high efficiency observation is expected in terahertz frequencies when brightness temperature of sources are higher than about 100 K, and that bunched photon can be used to measure delay time of photon arrival, hence phase information can be obtained. Possible applications are for high angular resolution observations of far-infrared atomic fine structure lines, and for searching and imaging studies of exo-planets.

There are many challenges to realize PCTI, such that fast photon counting detectors in terahertz frequencies are required, that accurate photon arrival timing be measured, and that efficient recording and usage of photon statistics be realized. I will be discussing current status of these challenges and a roadmap to realize PCTI. Some experimental evaluation of bunched photon measurements will be presented.