S1-5: Photon-based radiometry at KRISS

Authors: Kee Suk Hong, Dong-Hoon Lee, Seongchong Park, In-Ho Bae, Seungkwan Kim

Affiliation of authors: Korea Research Institute of Standards and Science (KRISS), Daejeon, Korea

Speaker: Kee Suk Hong

Speaker email: hongi2011(at)kriss.re.kr

Abstract: We present the research activities in the field of photon-based radiometry at the Center for Photometry and Radiometry of KRISS. The most urgent task is to provide the calibration service for the single photon counting detectors. We are preparing the detection efficiency calibration of single photon counting detectors based on Si and InGaAs avalanche photodiodes as a function of wavelength from 250 nm to 1600 nm, which should be traceable to the “classical” spectral responsivity scale. The validity of this calibration measurement is additionally tested by comparison with the “quantum” method based on a correlated photon source at one fixed wavelength. The second issue is to develop a well-characterized test source for single photon detectors. For this purpose, we are developing a single photon source based on the single Silicon-vacancy center in nano-diamonds. To make the single photon source more useful for applications such as quantum communication, we also realize the wavelength conversion device that can convert the single photons at 738 nm to the fiber communication wavelength of 1310 nm. The ultimate goal of our activities is to realize a radiometric standard source of single photons, which provides only one single photon in a defined region of time and space with an accurately measurable probability.