

Interferometry using dual photon response of submm direct detectors

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Abstract— When two or more photons arrive to a detector at the same time they produce an interference signal with frequency which is the difference of photons individual frequencies. If the detector's internal integration time is small enough this differential photon signal is present at the detector's output. This signal preserves photon's differential phase and thus can be used for non beam combining interferometry. In this contribution we demonstrate experimentally the single station differential photon operation mode as well as differential dual photon non beam combining interferometer using two of such detectors. We use superconductor-insulator-superconductor (SIS) junction as a fast direct detector. Applications of this dual photo interferometry for current and future instruments will be discussed. Directions and approach to detector parameter optimization and development towards realization of described the interferometry principle will be discussed.