Superconducting Nanowire Single-photon Detectors:
Quantum Efficiency vs.Thickness of NbN Films

M. Hofherr¹, D. Rall¹, K. S. Ilin¹, A. Semenov²,
N. Gippius³ and H.-W. Hübbers² and M. Siegel¹

¹Institut für Mikro- und Nanoelektronische Systeme,
Universität Karlsruhe, Karlsruhe, Germany
²DLR Institut für Planetenforschung, Berlin, Germany
³LASMEA, CNRS, Universite Blaise Pascal, Aubiere, France

E-mail: m.hofherr@ims.uni-karlsruhe.de

Abstract - The quantum efficiency (QE) of thin NbN superconducting nanowire single-photon detectors (SNSPD) has been systematically studied in a wide spectral range from 400 to 2000 nm radiation wavelength. SNSPDs were made from thin NbN films with thickness between 4 and 12 nm deposited on sapphire substrates. The observed reduction of QE with increasing radiation wavelength is caused by a crossover from the “hot-spot” to the “vortex” mechanism of the nanowire detector response. The crossover wavelength shifts to shorter wavelengths with increasing thickness of NbN films.

IEEE/CSC & ESAS EUROPEAN SUPERCONDUCTIVITY NEWS FORUM (ESNF), No. 11, January 2010
Published in Journal of Physics Conf. Series (SuST) 234, 012017 (2010)