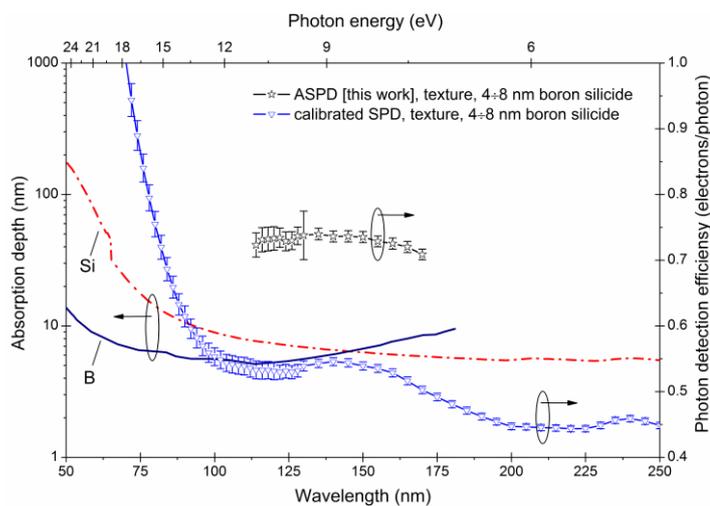


## Silicon avalanche photodiode photon detection efficiency in the wavelength range of 114 – 170 nm

Aruev P.N., Belik V.P., Bobashev S.V., Zabrodskii V.V., Nikolaev A.V. and Sherstnev E.V.

Ioffe Institute, S-Petersburg, Russia

Currently, the development of the detectors, which effectively detect vacuum ultraviolet (VUV) is relevant for solving a wide range of scientific problems in the physics of high-temperature plasma, detecting synchrotron radiation, and studying dark matter [1, 2]. We have designed an improved avalanche silicon precision detector (ASPD) [3] for detecting vacuum ultraviolet radiation. It was demonstrated that the detector has a photon detection efficiency superior to 0.65 electrons/photon, in the wavelength range from 114 nm to 170 nm, with an external quantum yield from 49 to 7000 electrons/photon at a reverse-bias voltage from 190 V to 315 V, respectively. The detector's active area diameter is 1.5 mm.



Spectral dependences of the ultraviolet quanta absorption depth and the photon detection efficiency [3]

- [1] P. Agnes et al., **“Direct Search for Dark Matter with DarkSide,”** J. Phys. Conf. Ser. **650**, 012006 (2015)
- [2] Wei Zheng, Lemin Jia, Feng Huang, **“Vacuum-Ultraviolet Photon Detections”**, iScience, Volume 23, Issue 6, 2020, 101145, ISSN 2589-0042
- [3] P. N. Aruev et al., **“Silicon avalanche photodiode with photon detection efficiency superior to 0.65 electrons/photon in the wavelength range of 114–170 nm”** Optical Engineering, 2021, in print