

# PhotonMEADOW 2023

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## Silicon Carbide ultra-thin membranes for X-ray beam position and intensity monitoring

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In this work, the performances of thin (0.5um-10um) Silicon Carbide (SiC) membranes as in-line X-ray Beam Position Monitors (XBPM) for synchrotron beams presented and compared with commercial single- and polycrystalline diamond ones. Results show that SiC devices can reach superior transparencies with respect to diamond, thanks to the realisation of <2um thick sensors, while allowing for much larger active areas and zero-voltage operating conditions.

Given the obtained experimental and theoretical results and availability of electronic-grade epitaxies on up to 8inch wafers, we expected that SiC will substitute diamond in most X-ray beam monitoring applications, even in the cases of extreme X-ray power densities, such as pink and white beams. This is because, in such conditions, although the material properties of diamond are superior, SiC, thanks to the larger sensors sizes, allows for better heat dissipations and -overall- device reliability.

At the conference an overview of the different SiC XBPM products realised by SenSiC GmbH (including beam and center stops: intensity and position sensors), as well as preliminary results on XFEL beam monitoring, will be presented.

### Journal of Synchrotron Radiation Special Issue: will you submit your contribution?

yes

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