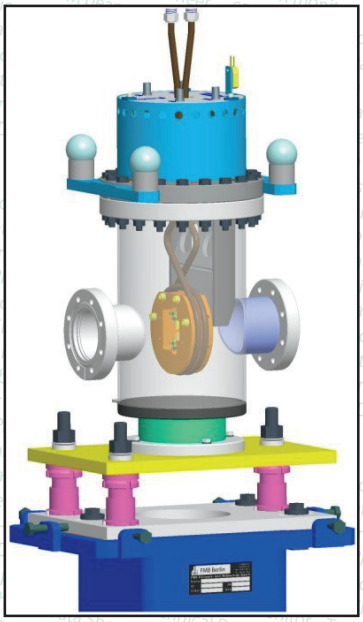
Technical Data Sheet

FMB Berlin

SPM beam position monitor

FMB has over 15 years experience in building blade type X-ray beam position monitors (XBPMs). XBPMs made by FMB are widely used at many synchrotrons to measure the photon beam position at the micron level.

SPM unit



SPM 3D-model

Staggered blade pairs beam position monitors (SPMs) are a type of XBPMs used if only vertical beam positions have to be determined, e.g. at dipole radiation sources.

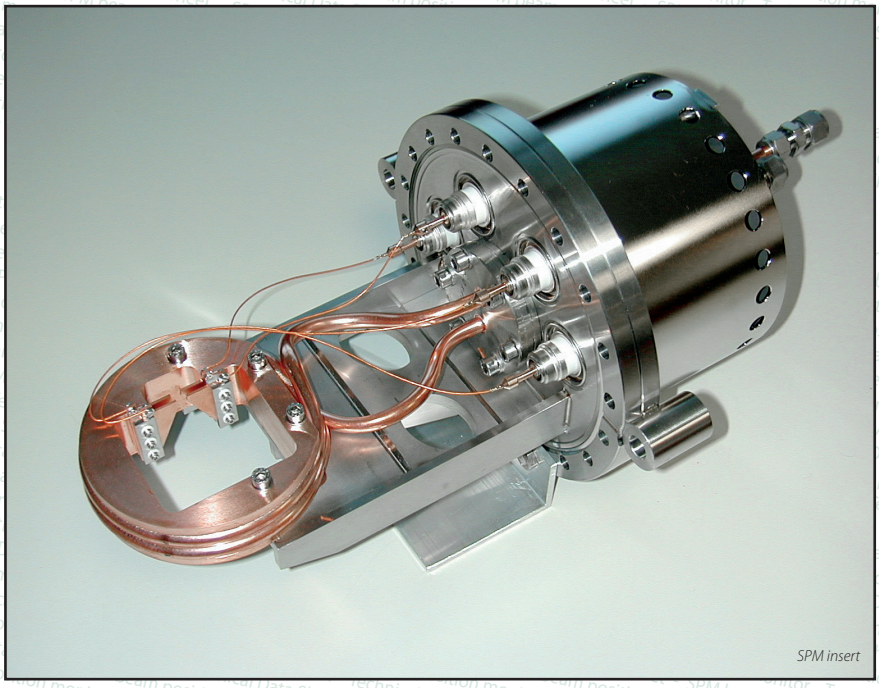
The FMB SPM design is based on a development by HZB (formerly BESSY), (Peatman, Holldack; J. Synchrotron Rad., Vol. 5 (1998), 639-641).

A typical FMB SPM system consists of the SPM insert, a vacuum chamber, a X-Y-Z manual alignment assembly and a support.

The SPM beam position monitors use four blades, whose narrow fronts are oriented towards the radiation source. They are arranged in two staggered pairs, one pair mounted above the other. With this blade setup the operator is able to scan the off-axis radiation of the source and determine on-line the position of the radiation source centre from the emitted signals.

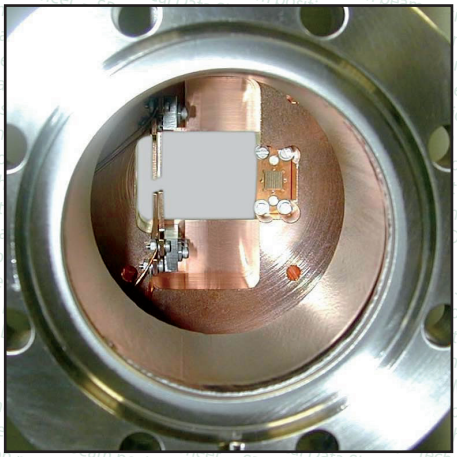
Size and geometry of the blades will be adapted to the beam characteristics at the place of the position monitor in order to achieve a maximum photocurrent yield at a maximum resolution.

The blades are made of OFHC Copper or Tungsten. They are actively cooled via heat conducting ceramics to resist the thermal load of the radiation.

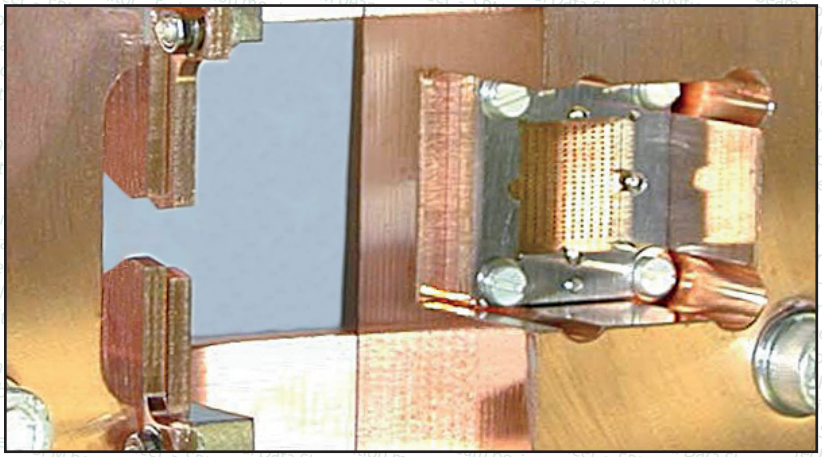


SPM insert

SPM beam position monitor



SPM with Pinhole array



detail of SPM with Pinhole array

Parameter	Specification
SPM insert	
Type:	Staggered blade pairs beam position monitor
Number of blades:	4
Blade material:	Copper / Tungsten
Aperture / blade opening, blade thickness / pair offset:	Suggested by FMB, depending on beam specifications at installation position
Cooling:	Water cooling
Temperature measurement:	Thermocouple K-type close to aperture
Electrical strength:	500 V
Feedthroughs:	Triax, miniature TC flat pin (others on customer request)
Base flange:	DN 150 CF fixed
Fiducials:	2 / 3 / 4 Hubbs or laser tracker supports at base flange
Pinhole array (optional):	Design according to customer requirements, 0.02 mm min. pinhole diameter dependent on foil thickness
SPM chamber	
Chamber / flange material:	1.4301 / 1.4429 (similar 304 / 316LN)
Beam entrance /exit flange:	DN 40 CF or different on customer request
SPM insert flange :	DN 150 CF fixed, oriented with respect to SPM insert
Additional flanges:	Optional on customer request
Support	
Column material:	Steel (Invar on request)
Manual chamber alignment:	Lateral ± 20 mm, vertical ± 12.5 mm, resolution. (l, v) < 0.1 mm
Alignment via X-Z-stage (optional) :	Lateral (X) ± 5 mm, vertical (Z) ± 5 mm, repeatability ± 10 µm (± 1 µm with optional encoder)

FMB Berlin

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