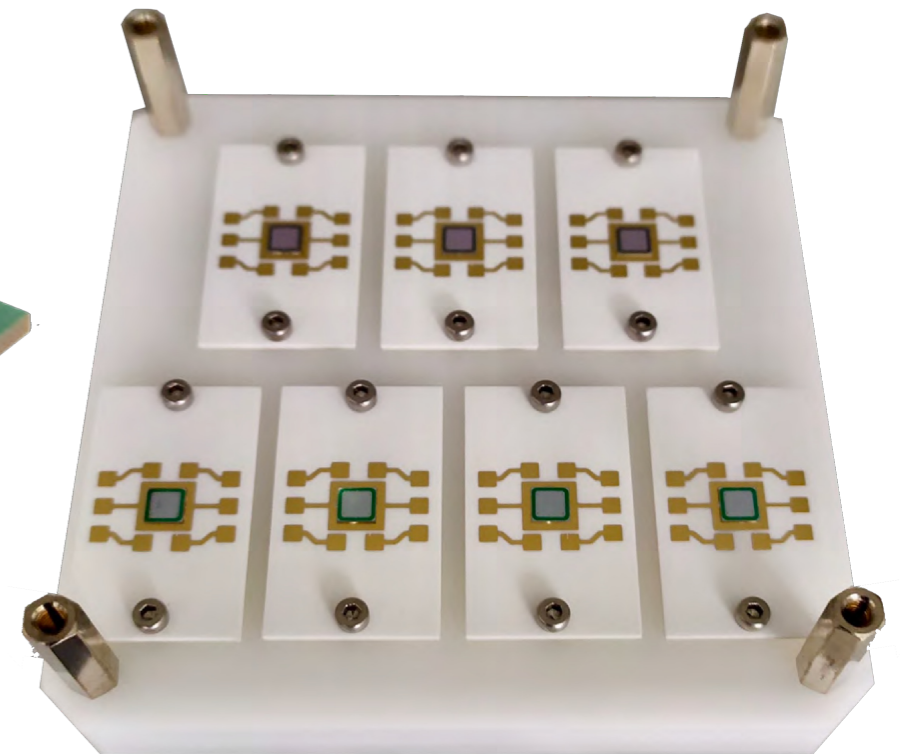
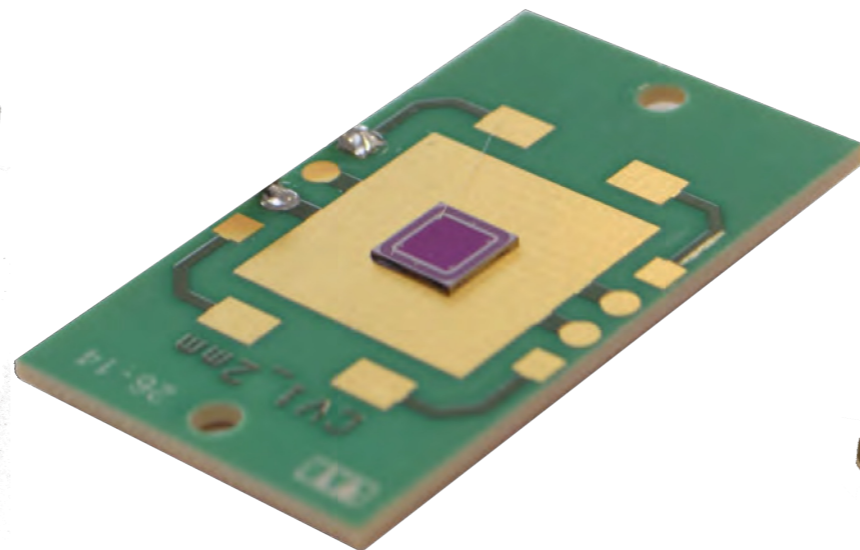


BEAM INTENSITY & POSITION MONITORS



**The photons you lose
at least count**

Alibava Systems offers Silicon Transmission Photodiodes with very low absorption $< 20\%$ (4,5 keV) and very high efficiency.

Alibava **Beam Intensity & Position Monitors** are small, easy to install and passive photodiode circuit for X-ray beam diagnostic applications. This solution provides actual X-ray beam intensity and position data through direct measurement. Furthermore, its transmission properties allow the online monitoring of the most critical beam parameter simultaneously with the data acquisition during an experiment.

This valuable characteristic is achieved through its innovative thin detector with a very high X-ray transmission, good responsivity uniformity, stable, low absorption, and uniform radiation stability.

This Beam Intensity and Position Monitors were developed in collaboration with ALBA Synchrotron. Thanks to its unique characteristics Alibava Beam Intensity and Position Monitors are especially useful not only for beamlines characterization in synchrotrons but also for quality control of monochromatic X-ray machinery.

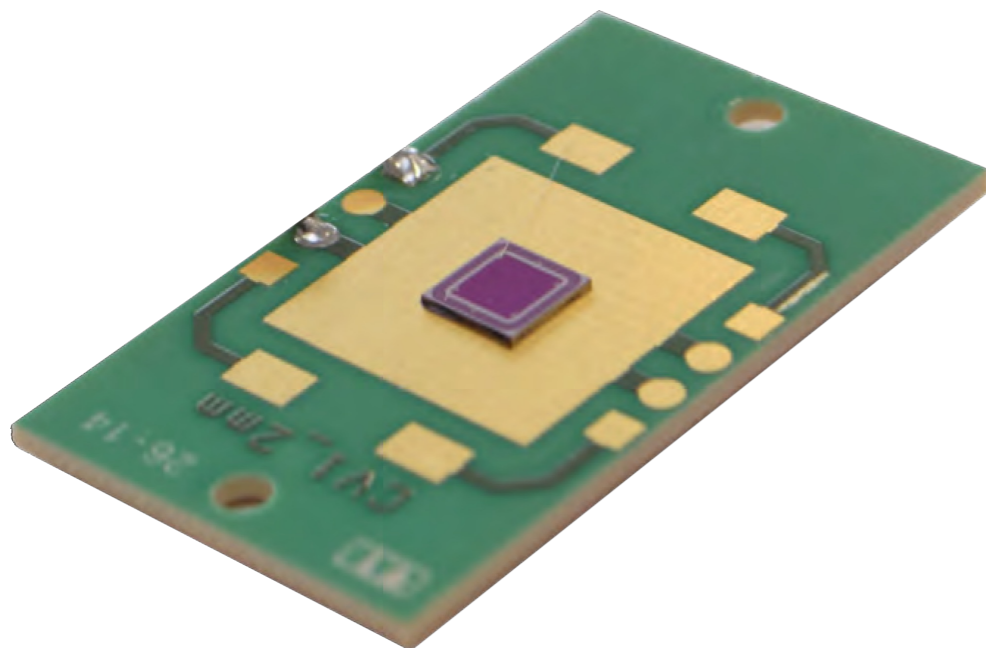


Developed in collaboration with ALBA Synchrotron.

This product is sold under license of Spanish National Research Council (CSIC).

02 Features & Electronic Characterization

- P on N silicon detector
- Size: 4.4x4.4 mm²
- Thickness: 3 / 5 / 10 μm
- No external voltage needed
- Easily mounted in the experiment
- The beam by the output current
- Depletion layer thickness (bias = 0): 2.6 / 3.7 / 7 μm



02 Features & Electronic Characterization

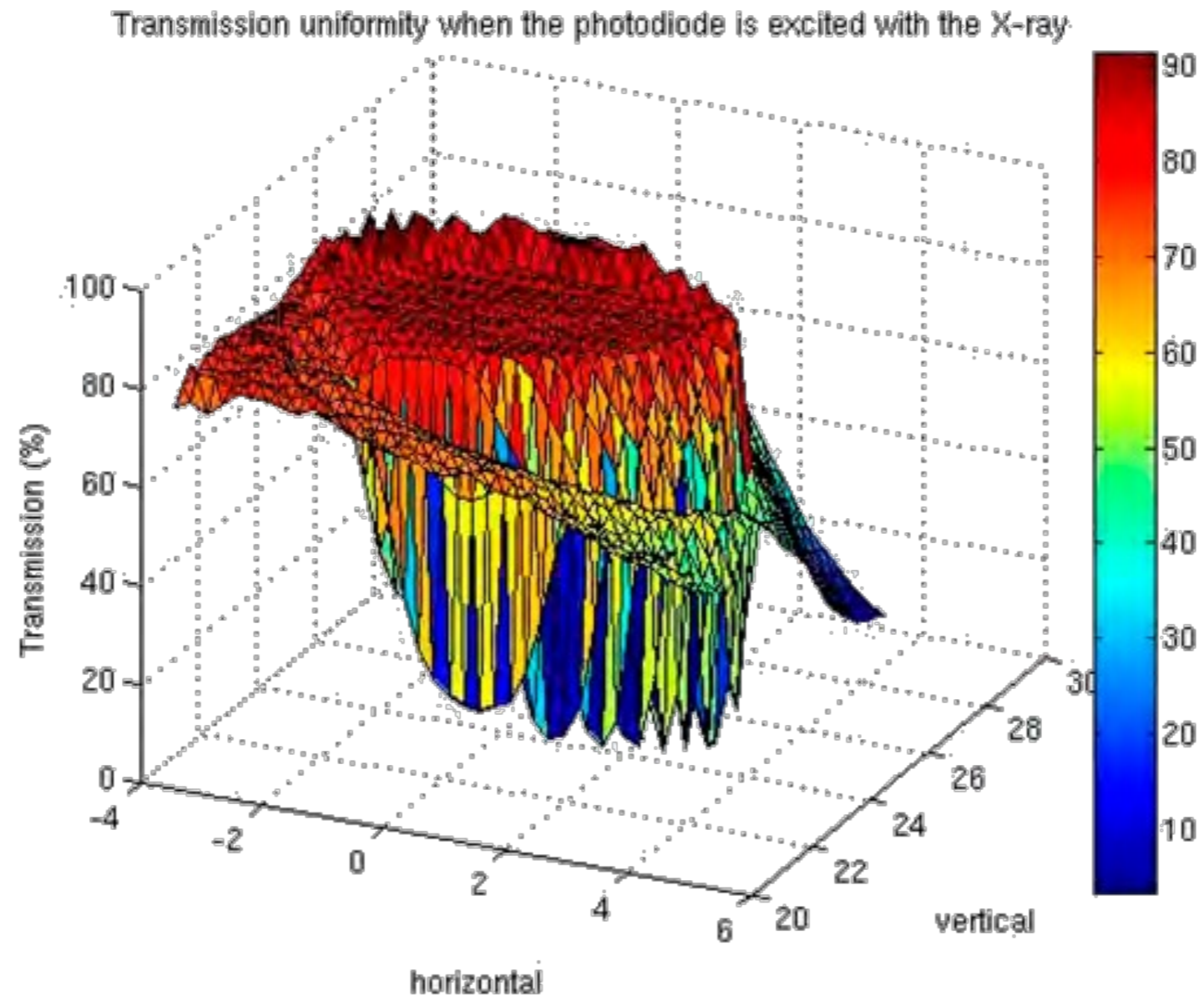
Electronic Characterization

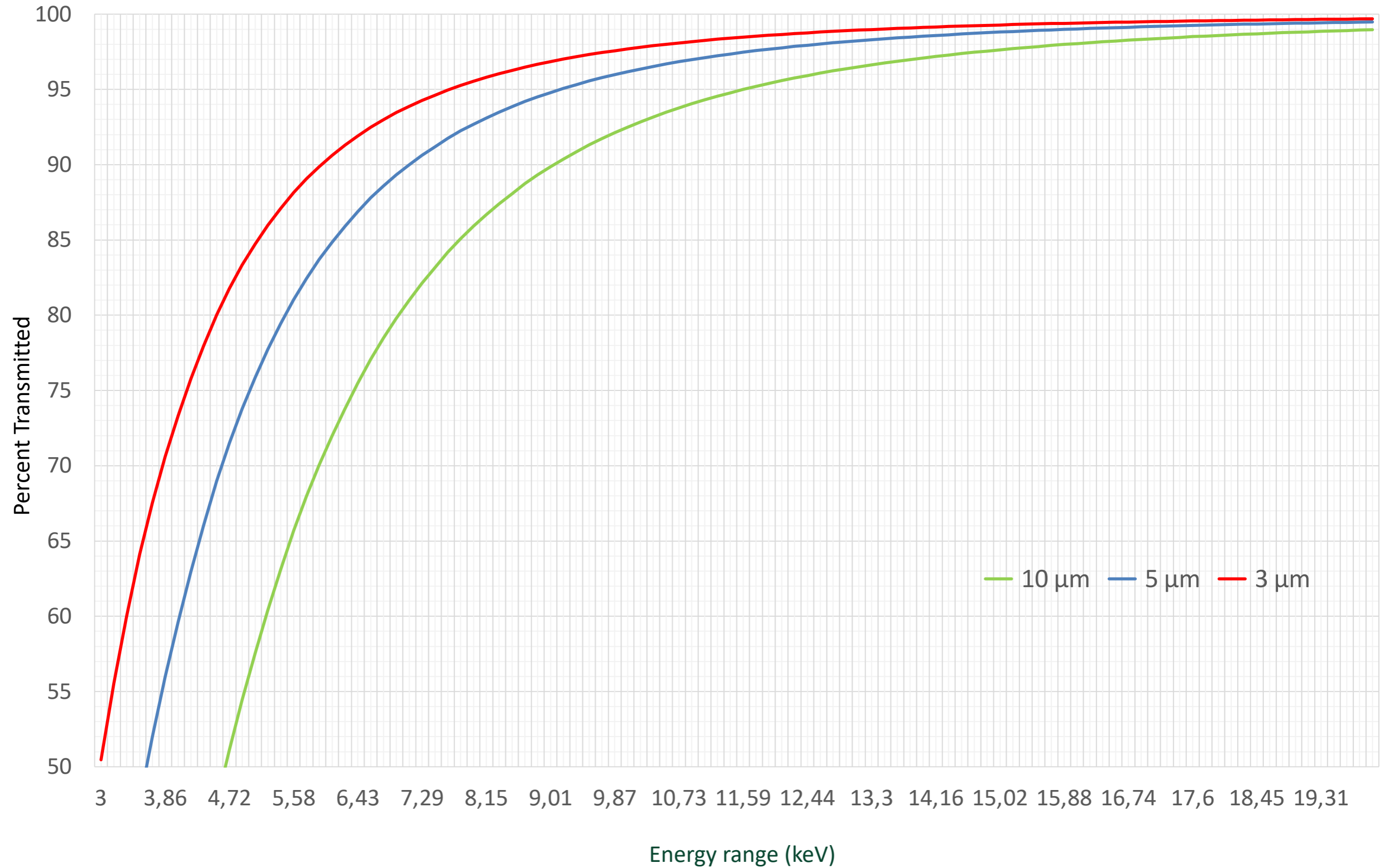
Model No.	Active area (mm ²)	Breakdown Voltage ⁽¹⁾ (V)	Dark Current ⁽²⁾ (pA)	Capacitance C ⁽²⁾ (nF)	Shunt Resistance (MΩ)	Sensitivity S ⁽³⁾ (A/W)	Max Storage T _e (°C)
Beam Intensity AS04-104X03 4.4x4.4mm ²	19.36	10	0.13	0,410	420	0,011	80
Intensity and Position AS04-404X03 4.4x4.4mm ²	19.36	10	0.13	0,410	420	0,011	80
Beam Intensity AS04-104X05 4.4x4.4mm ²	19.36	10	0.13	0,246	420	0,018	80
Intensity and Position AS04-404X05 4.4x4.4mm ²	19.36	10	0.13	0,246	420	0,018	80
Beam Intensity AS04-104X10 4.4x4.4mm ²	19.36	10	0.13	0,123	420	0.035	80
Intensity and Position AS04-404X10 4.4x4.4mm ²	19.36	10	0.13	0,123	420	0.035	80

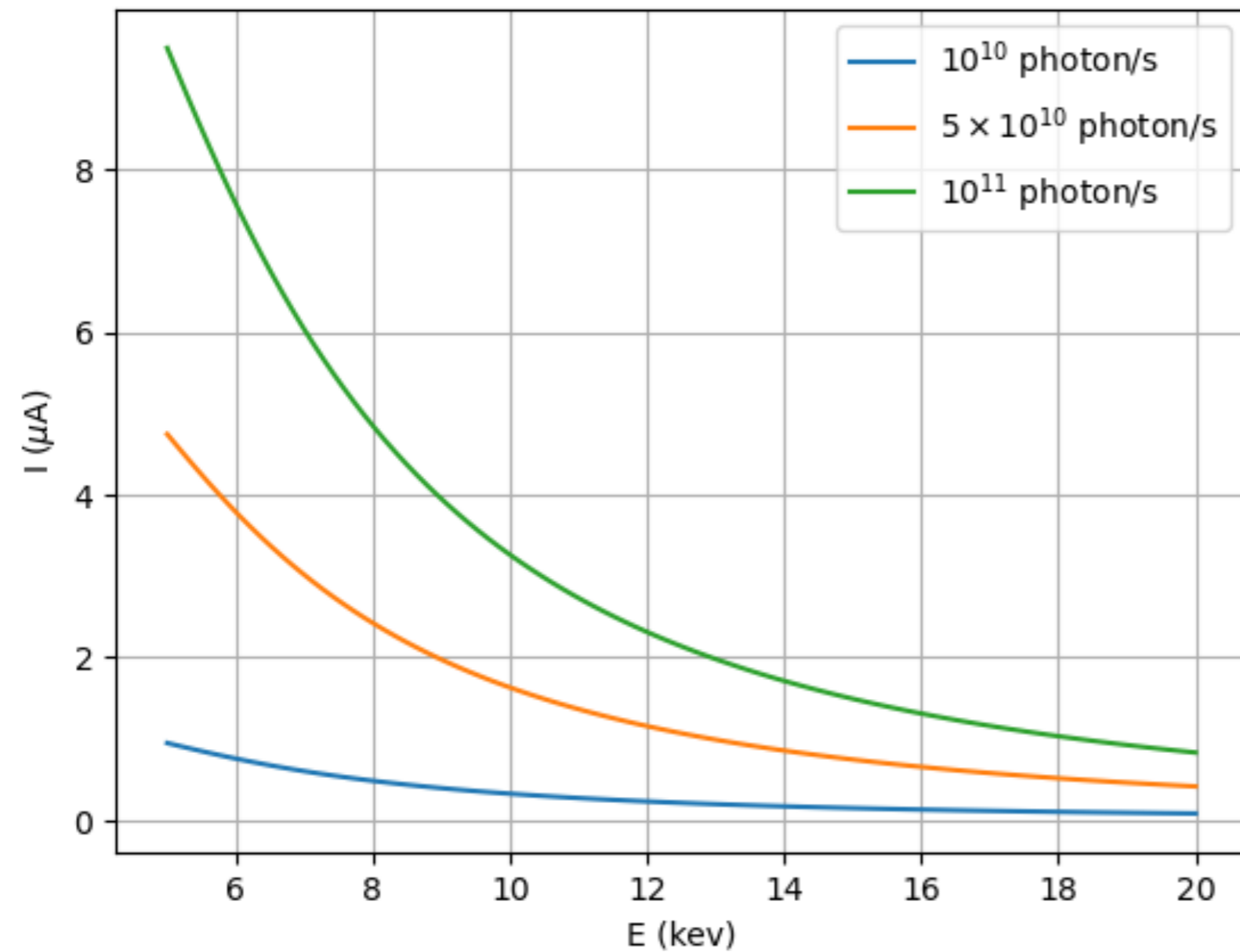
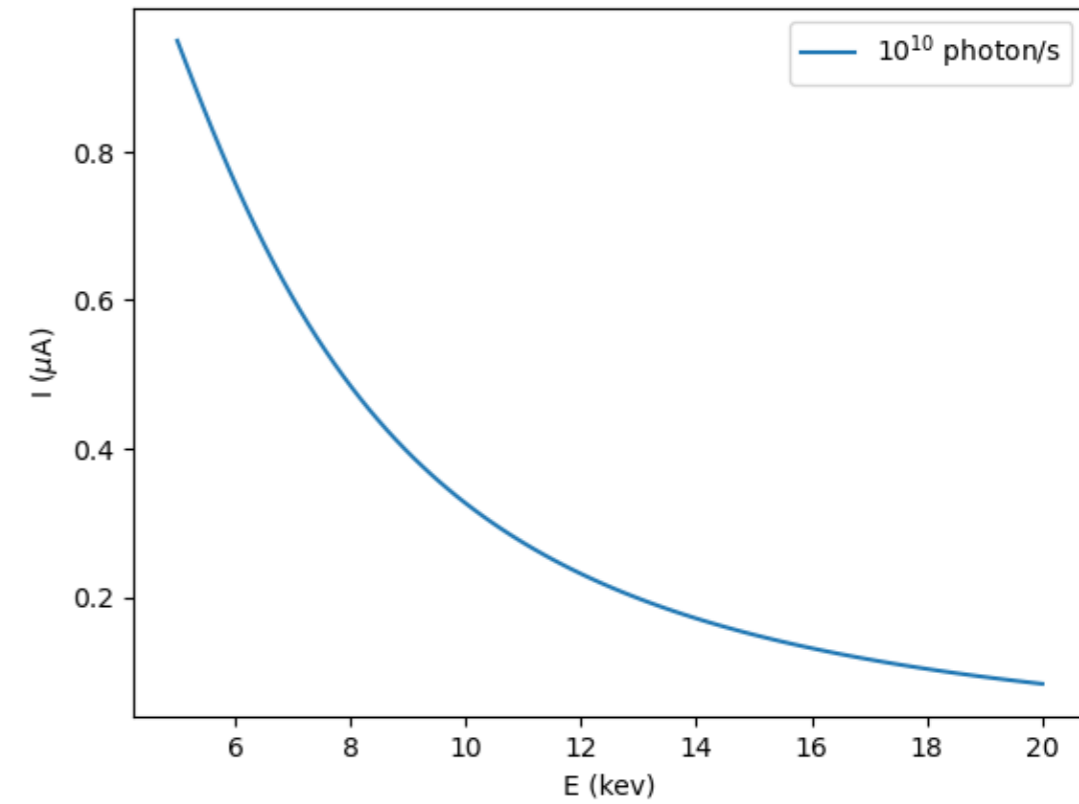
X: Different Product configurations

03 Transmission Properties

- Wide energy range
- Transmission level above 80% at 4.5 keV and 94% at 12keV
- Responsivity uniformity better than 5 % inside the active area





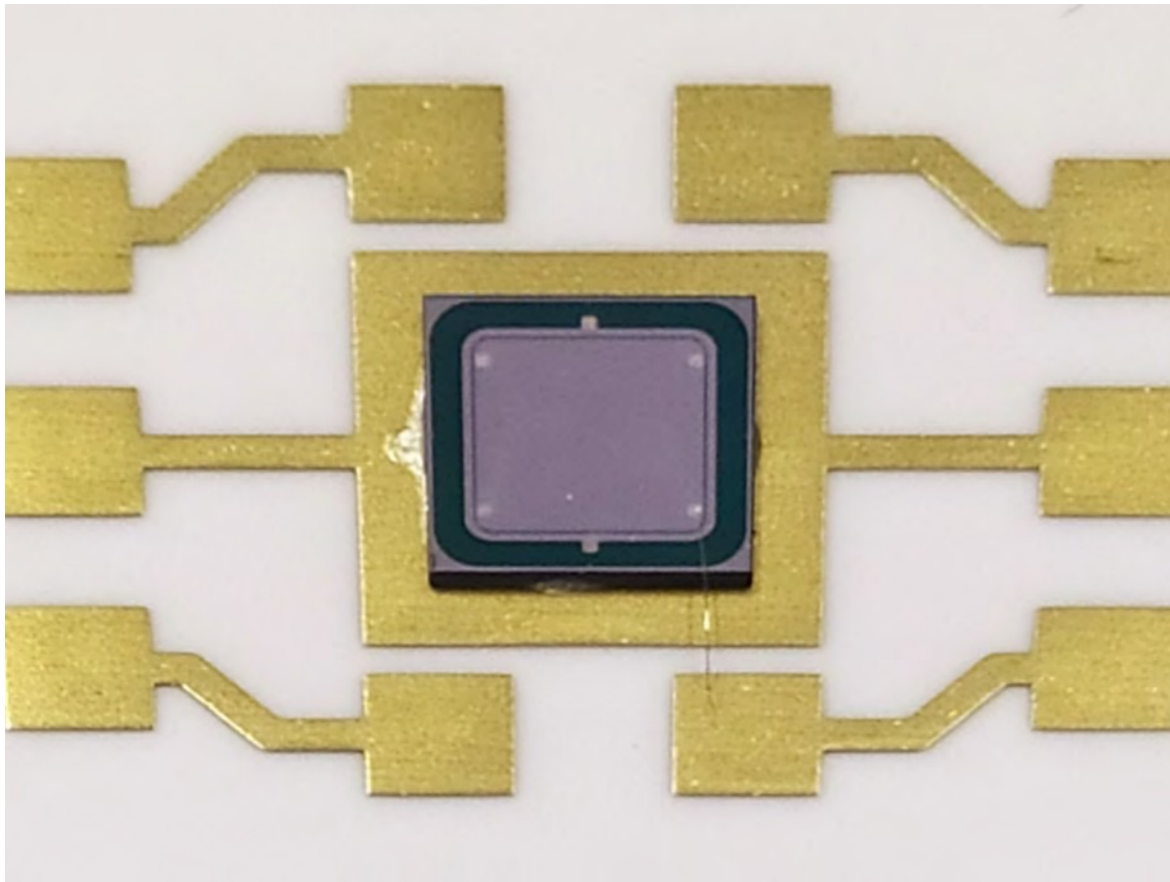
Current estimation for 10 μm detectorCurrent estimation for 10 μm detector

Using this [Excel sheet](#) you can estimate the current based on your energy range and photon flux¹.

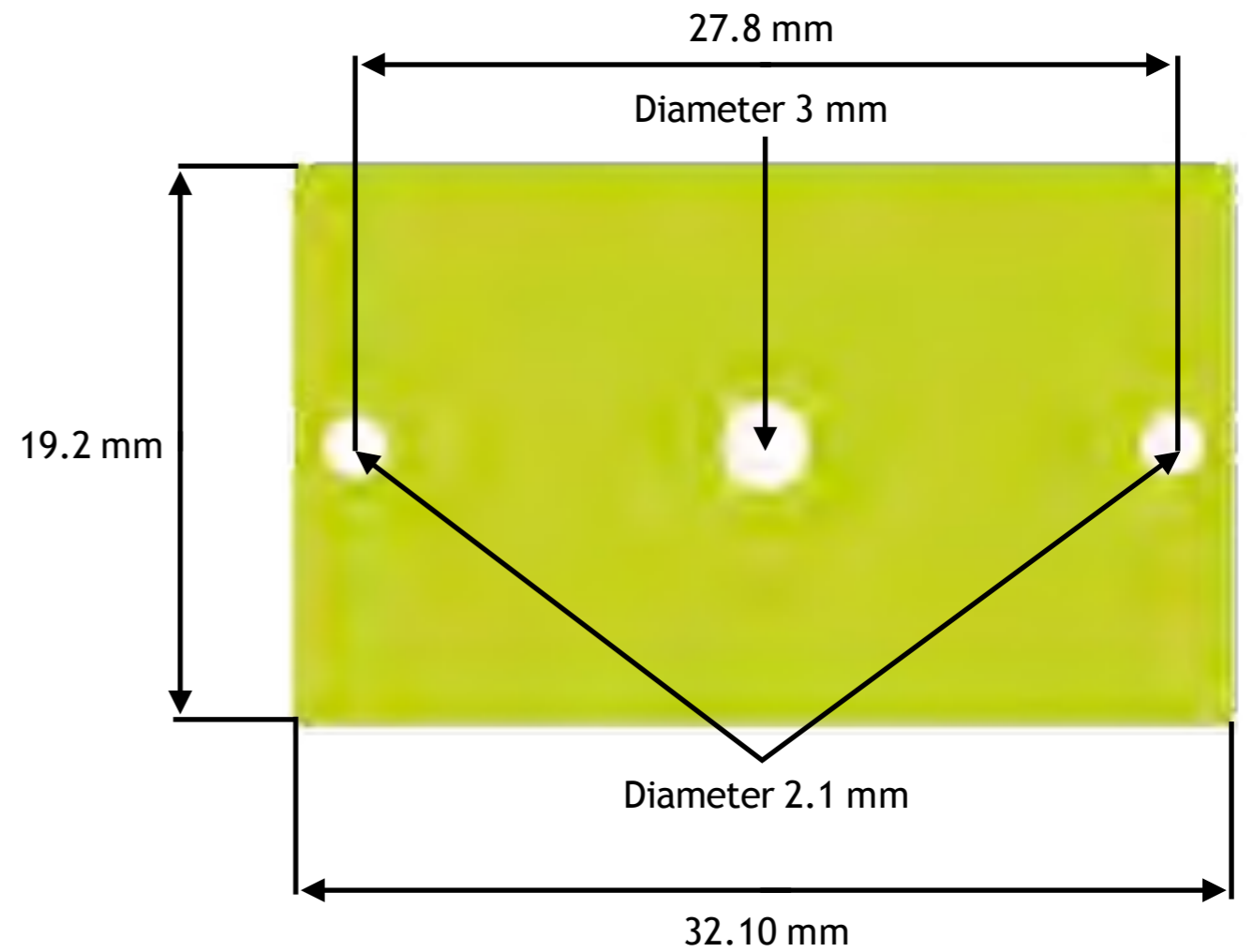
Current and transmission estimation - X-Ray beam intensity and X-Ray beam position monitors			
Thickness	10	[um]	
Photon flux	1,00E+10	[ph/s]	
Photon energy	5	[keV]	This approximation is valid between 5 and 40 kev.
Photoelectric cross section	244,1214096	[cm ² g ⁻¹]	
Expected transmsion	5,66E+01	[%]	
Expected signal	9,49494E-07	[A]	

1. Owen, R. L., Holton, J. M., Schulze-Briese, C., & Garman, E. F. (2009). Determination of X-ray flux using silicon pin diodes. *Journal of synchrotron radiation*, 16(Pt 2), 143-151. <https://doi.org/10.1107/S0909049508040429>

Diode Detail



Printed Circuit Board*



*Diode is not shown

**Single and four
quadrants designs to
perform intensity and
position measurements**

01 Different Configurations

Alibava Beam Intensity & Position Monitors can be provided in four different configurations:

1. Standard

The diode is installed on a compact light-shielded housing equipped with fixation holes and Lemo connectors.

- Opaque housing
- Individual coaxial Lemo connectors
- Dimensions: 41x68x12.5 mm



02 Different Configurations

2. Vacuum

The diode is installed on a very compact high vacuum compatible chamber with KF 40 terminations.

- 36 mm compact chamber
- KF 40 terminations
- Individual coaxial Lemo connectors

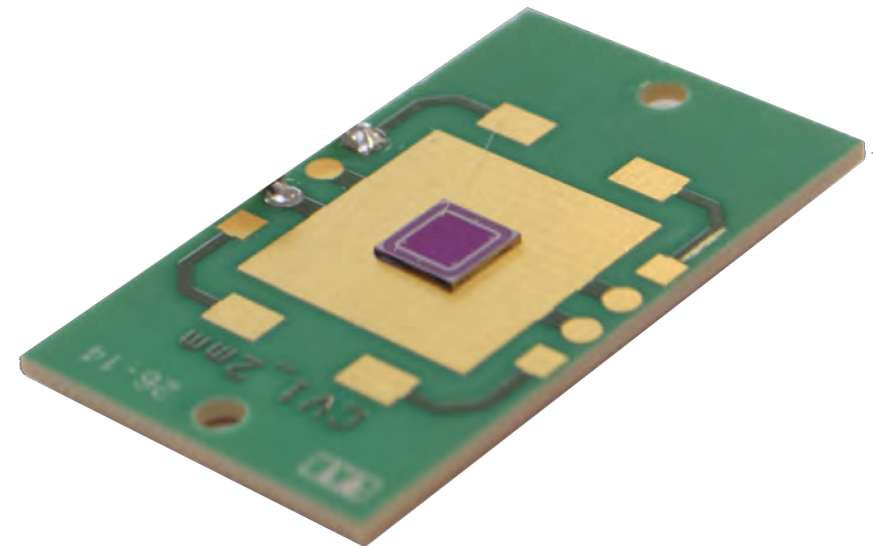


3. Naked

The diode is provided a high vacuum compatible PCB which makes the system ideal for custom integration.

For Dimensions:

[See Printed Circuit Board at page: Diode Detail & PCB.](#)



03 Different Configurations

4. Ultra High Vacuum

This UHV X-Ray Beam Intensity and Position Monitors have been especially developed for UHV environments based on UHV compatible materials with very low outgoing rates. Each device is supplied with an outgassing test report.

These features make the UHV Beam Intensity & Position Monitors ideal to be installed on the optical elements of the beam line as can be monochromators and mirrors as well as in high demanding vacuum experimental environments.

For Dimensions:

[See Printed Circuit Board at page: Diode Detail & PCB.](#)

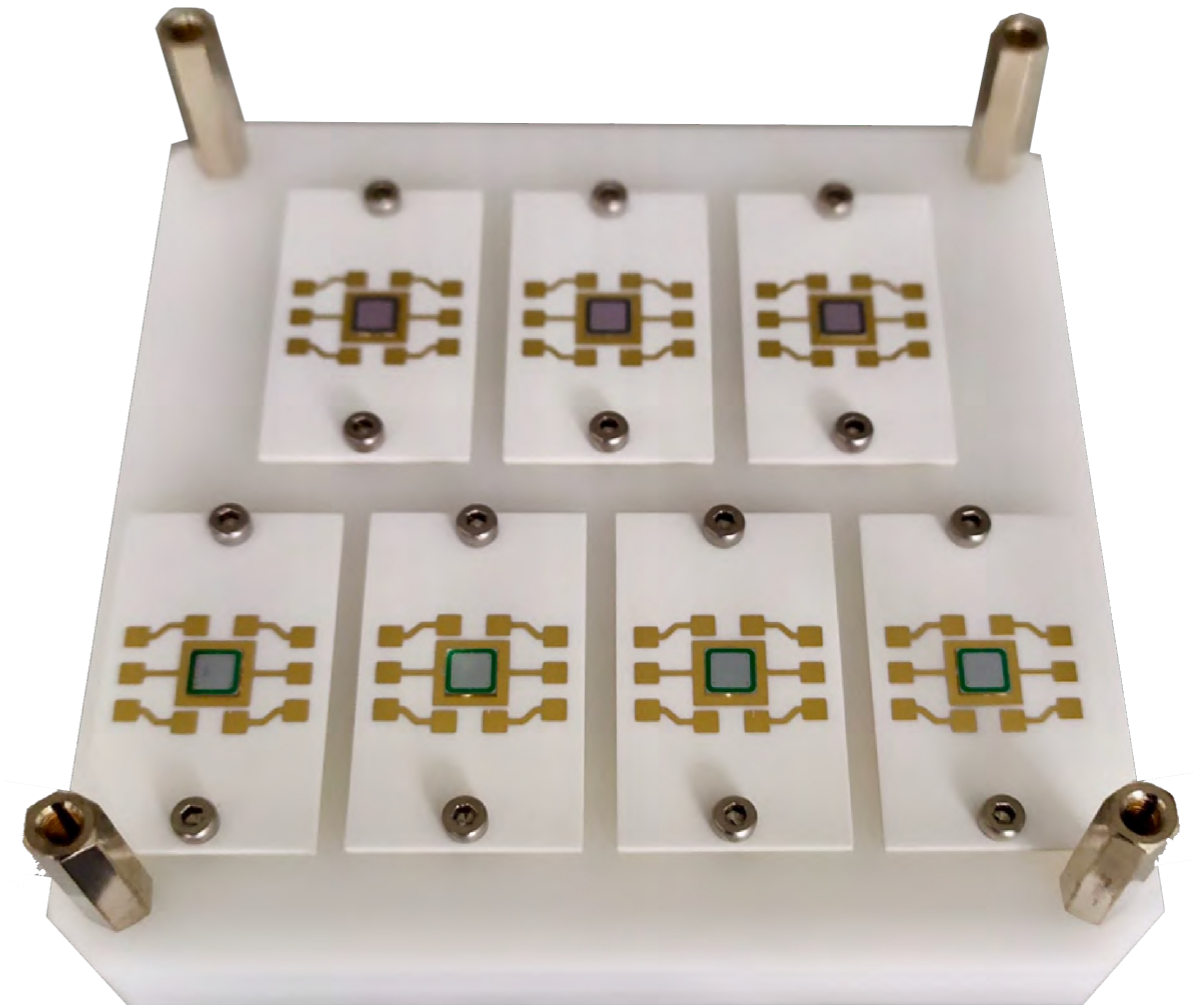


Users of Beam Intensity & Position Monitors

05 Sirius Synchrotron

Alibaba Systems have supplied the Brazilian Center for Research in Energy and Materials (CNPEM) with six **UHV Beam Intensity** for the Sirius Synchrotron de Brasil.

Sirius Synchrotron will use these diodes for beam monitoring and conditioning at the optical part of beamlines.



Brazilian Synchrotron
Light Laboratory



CNPEM

Alibava Systems have supplied Elettra Synchrotron Trieste with a **Vacuum Beam Intensity and Position Monitor**.

Elettra Synchrotron uses **Alibava Beam Position Monitors** together with Elettra Fast **Picoammeter** to perform beam optimization and Beam Intensity Monitoring.



Elettra Sincrotrone Trieste



Picoammeter

**Especially suited for applications
where multi-channel fast**

acquisition is a concern

I.E. Feedback

Systems

01 Picoammeter

Alibava Systems can also provide fast acquisitions **Picoammeter** specially suitable for beam intensity and position measurement.

Applications

- Ultra-low current measurements.
- Beam position monitoring.
- Si and Diamond detectors readout.
- Ion chamber readout.



**Want To Learn
More?**

For more information about the **Beam Intensity & Position Monitors** please contact us:

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