



Contribution ID: 176 Contribution code: WEP25

Type: **Poster Presentation**

## Accurate beam spot fitting for transverse beam size measurement in the HALF injector

Wednesday, 11 September 2024 14:20 (1h 30m)

For the fourth-generation synchrotron radiation (SR) light source, obtaining high-quality light heavily relies on the performance of the injector, which requires the accurate measurement of the transverse beam size. Therefore, an improved beam spot fitting method has been proposed to enhance measurement accuracy. Since beam spots do not always follow a standard Gaussian distribution, traditional Gaussian fitting methods struggle to achieve the required precision. This paper conducts a preliminary analysis of beam spot data to select the most suitable fitting model, including the superposition of two Gaussian distributions, the generalized Gaussian distribution, and the skewed Gaussian distribution. By choosing the most appropriate model, the transverse beam size can be measured more accurately, thereby meeting the high-performance requirements of injectors for synchrotron radiation sources. Experimental measurements were conducted on the electron gun of the injector of the Hefei Advanced Light Facility (HALF), verifying the feasibility of the proposed method.

### Footnotes

### Funding Agency

### I have read and accept the Privacy Policy Statement

Yes

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**Session Classification:** WEP: Wednesday Poster Session

**Track Classification:** MC4: Transverse Profile and Emittance Monitors