

Optical Front End

For the Wire Scanner Diagnostic Systems



Highlights

One of a kind unibody Optical Front End.

Compatible with any kind of scintillator.

Located outside the radioactive zone (the signals from the scintillator to the Optical Front End are transported by optical fibres).

8-channel module: 4 photo diode channels plus 4 avalanche photo diode channels.

The Wire Scanner Diagnostic System can be customised to cover the specific needs of different accelerators.

Applications

- Wire scanner for Free Electron Lasers (FEL).
- Wire Scanner for particle colliders.
- Ultra High Resolution beam profile measurements.

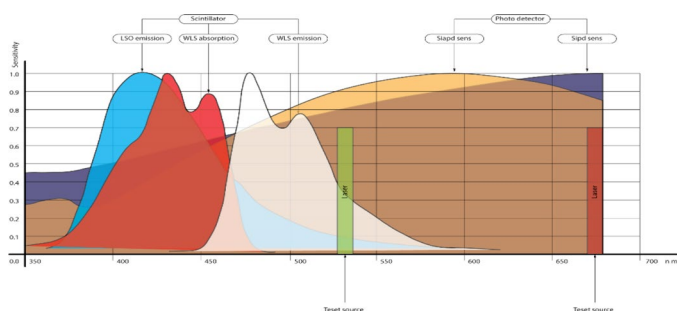
How Does It Work?

It is of primary importance for accelerators to control the transverse dimension of the beam, both to guarantee low emittance (free-electron lasers) and meet the design luminosity (colliders).

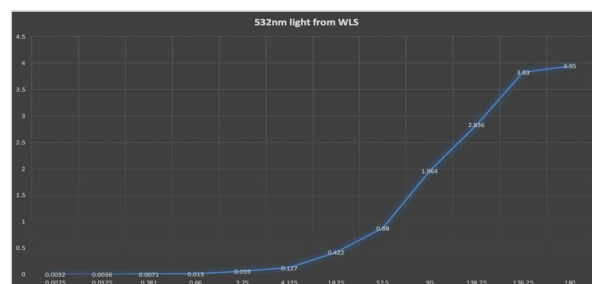
The Wire Scanner is a beam diagnostic tool, which allows for online profile measurement while minimally perturbing the beam and then makes the profile available to the control system.

The profile is measured using a thin metal wire scanning across the accelerator beam. The measured signals are propagated through the optical fibres to the service gallery, where the Optical Front End is located.

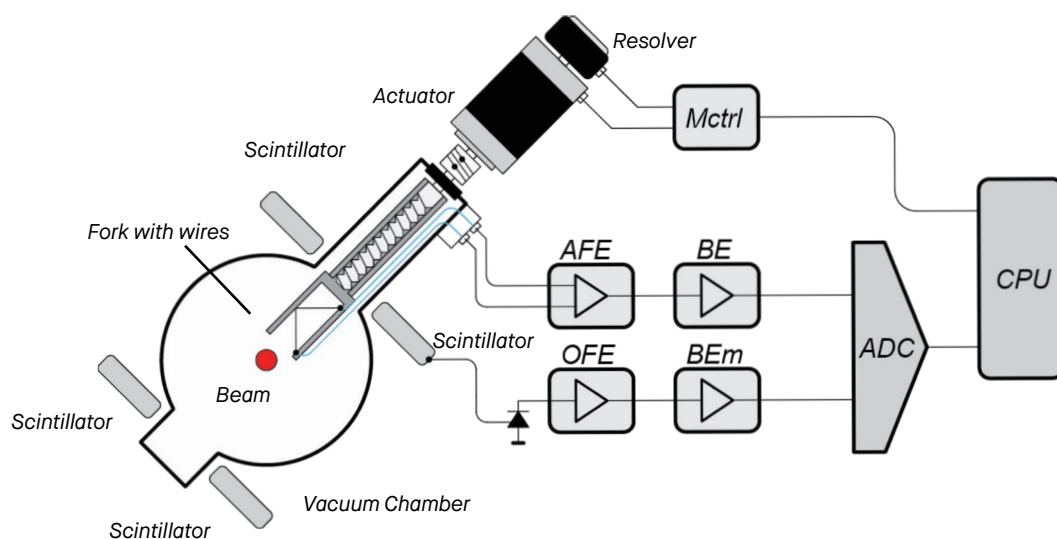
The Optical Front End converts the light pulses into electrical signals. Their amplitude is proportional to the charge density of the beam, and the beam transverse profile is obtained by plotting the signal amplitudes vs. the wire transverse position.



Light wave length spectrum



Wire Scanner Diagnostic System Block Diagram



The Wire Scanner is composed of an Analog Front End (AFE), Back End (BE), Optical Front End (OFE) and Back End modified (BEm). The components are linked together and controlled by the control and processing software.

Data Analysis App for Mobile Devices

Acquisition - Data is acquired by the Wire Scanner beam diagnostic system for beam profile analysis.

Elaboration - Data goes through mathematical elaboration to obtain a graphical form for layering and presentation of the values measured by the Wire Scanner.

Layering - Acquired and elaborated data from the Wire Scanner diagnostic system is prepared for further analysis after it has been organised and compared to the theoretical values calculated for a certain situation.

Visualization - Data is visualized on the mobile device screen.

