The Zero Degree Detector at BESIII

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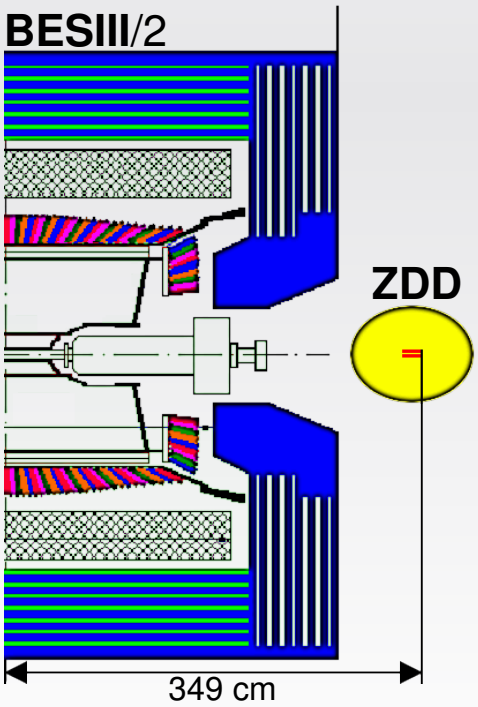


Each section is made of two modules, upper and lower, volume $14 \times 4 \times 6$ cm^3 each

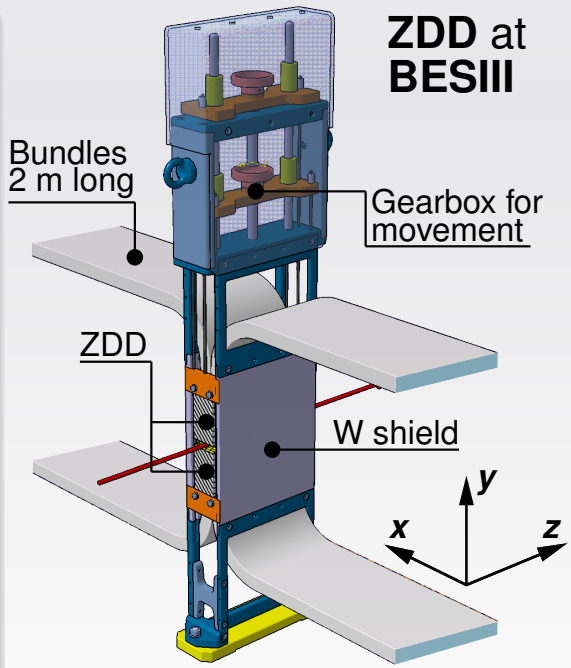
The empty 10 mm-wide slot between the upper and lower module geometrically suppresses the Bremsstrahlung background

The calorimeters are arrays of scintillating fibers (60% in volume) embedded in lead

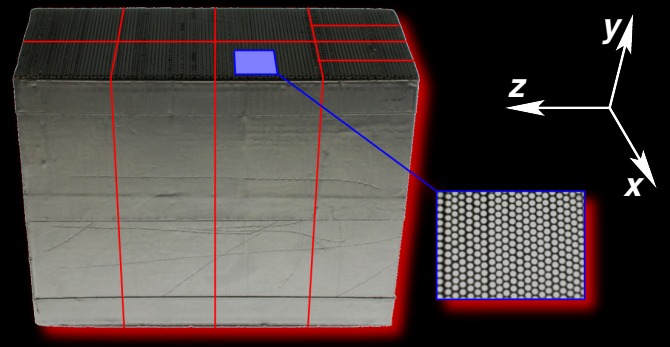
The fibers are lined up along the *y* axis and read out from the upper or lower face

The modules are segmented in the *xz* plane the first layer has a thinner segmentation to have a better *x*-resolution

The signal is extracted and channeled to PM's through bundles of clear optical fibers



ZDD: a lead-scintillating fiber calorimeter



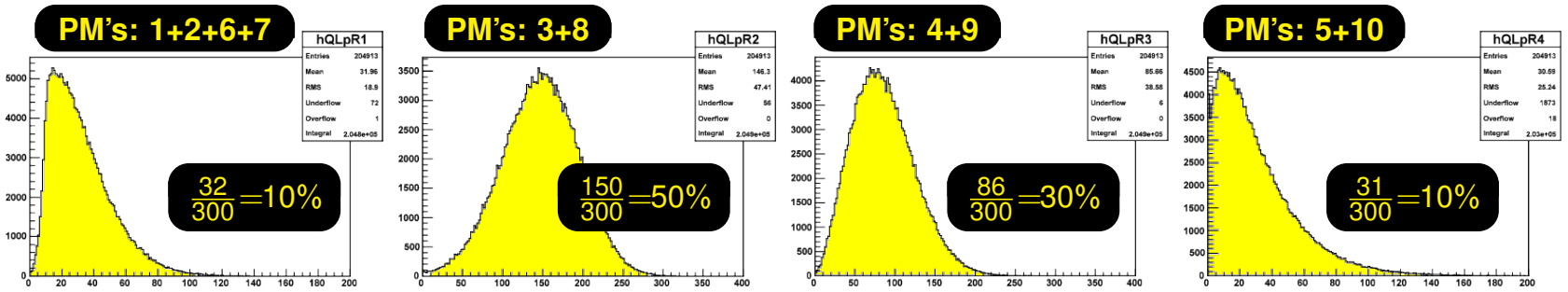
The ZDD segmentation

5	4	3	1
			2
10	9	8	6
			7

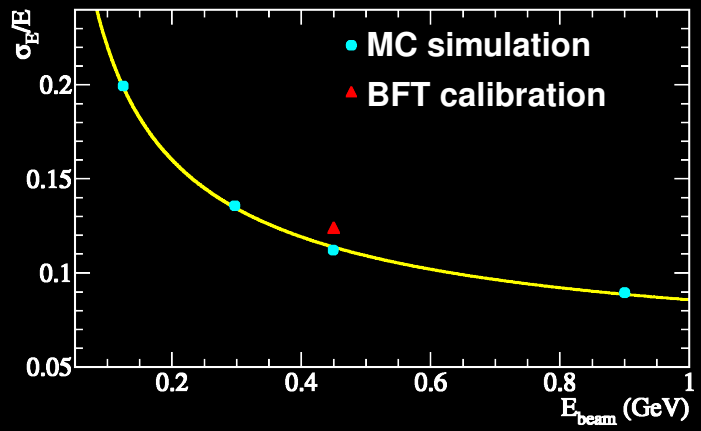
z
x
Beam

Each sector is sent to a photomultiplier

Shower profile along the four layers with 450 MeV electrons



The ZDD accuracy



The resolution is

$$\frac{\sigma_E}{E} = \frac{p_0}{\sqrt{E/\mathrm{GeV}}} \oplus p_1$$

- $p_0 = 6.8\,\%$
- $p_1 = 5.2\,\%$