

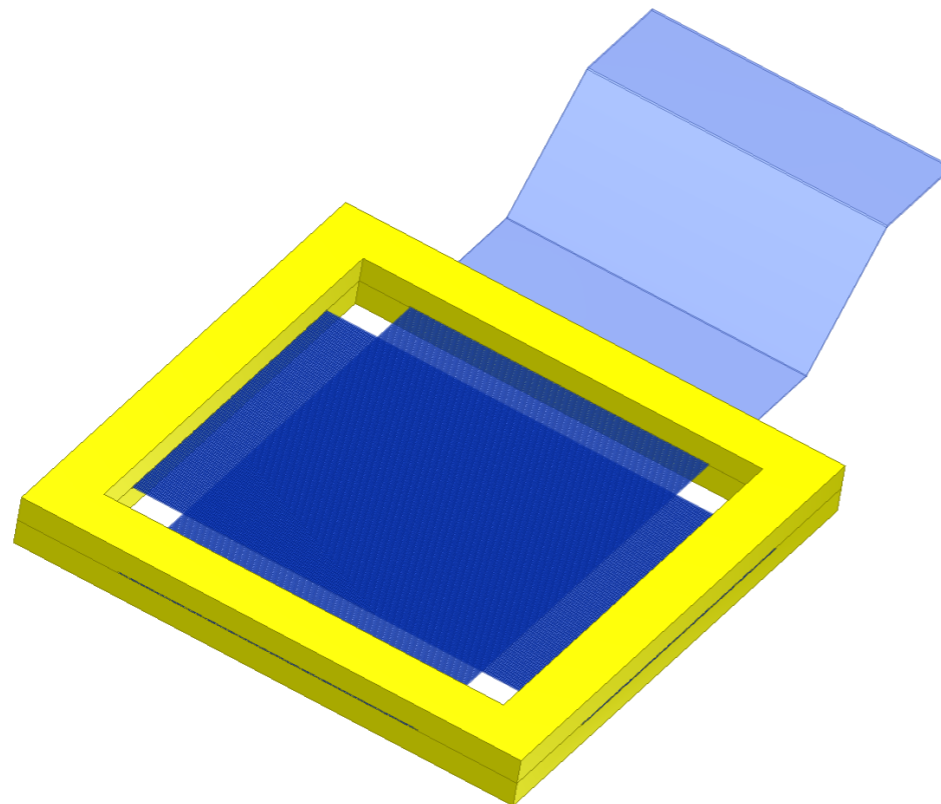
Active Target



ATAR

"visible and invisible fire"
(Avestan language)

- The **thinnest** and **fast** available scintillating fibers coupled to **SiPM**
 - to detect minimum ionizing and stopping particles in **high magnetic field** (1.5 Tesla) environment
 - to sustain **high beam rate** (up few $\times 10^8$ particles/s)
 - to provide superior **position** ($< 100 \mu\text{m}$) and excellent **timing resolutions** ($< 500 \text{ ps}$ @ 10pbe)



Scintillating medium

Squared $250 \times 250 \mu\text{m}^2$ multi-clad scintillating fibers BCF12 (Saint-Gobain), peak emission @

435 nm) with a light yield of $\sim 8000 \text{ ph/MeV}$, a trapping efficiency of 7.3%, $1/e$ length 2.7 m and a time decay of 3.2 ns are the detection medium.

Photon detector

SiPM will be used to detect extremely weak light and to be operated in an high magnetic field (1.3 Tesla).

Each Fiber is readout by a single detector. The detector

efficiency is optimized using the SiPM with the higher PDE (65%) and gain (2.4×10^6), and low dark current rate (600 KHz @ 0.5pbe).

**HAMAMATSU
SI0362-II-100C**



Active Target

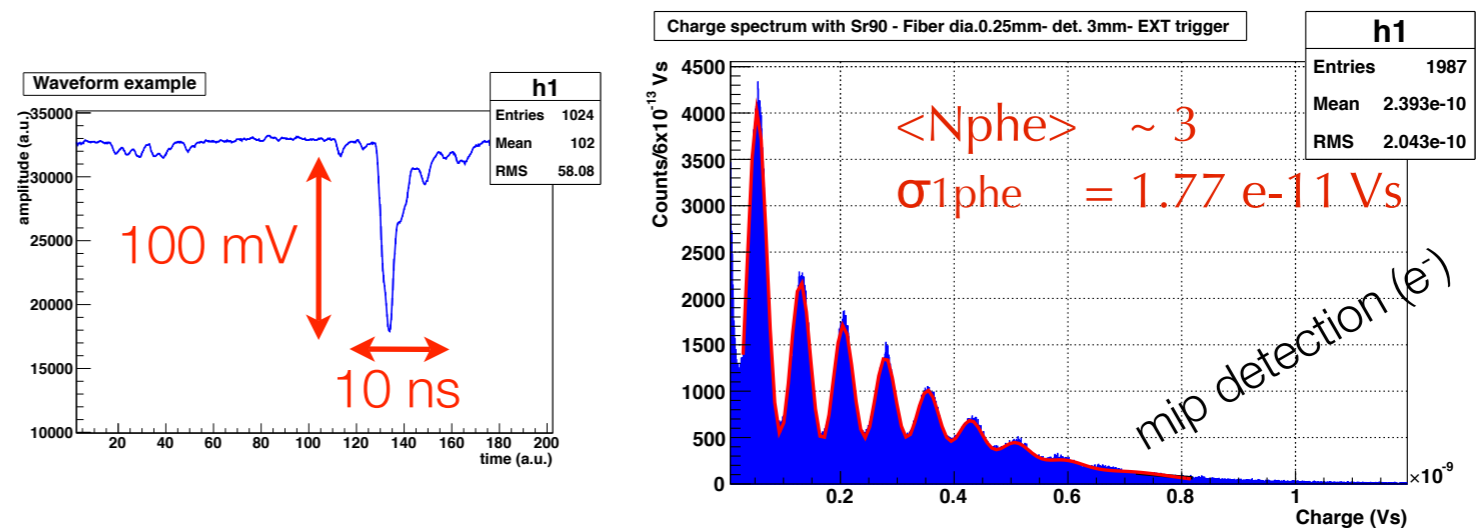
- It can give
 - a measurement of **high** beam intensity and **2-dimensional** beam profile
 - coupled with a spectrometer, a measurement of decay vertex and timing with **improvement of** the particle **momentum** and **angular** variables resolutions
 - **particle ID** (muons/positrons)

• FRONT-END

- smart and low-noise board (<10mV peak-to-peak)
- amplification factor: 10
- tunable input attenuation and output shape

• 5 GHz waveform digitizer

- sampling speed up to 5 GSPS
- excellent time and amplitude performances
- custom analysis waveform (pile-up rejection, template, after-pulse tagging etc.)



Beam profile at CC - Scanner Absolute Unit

