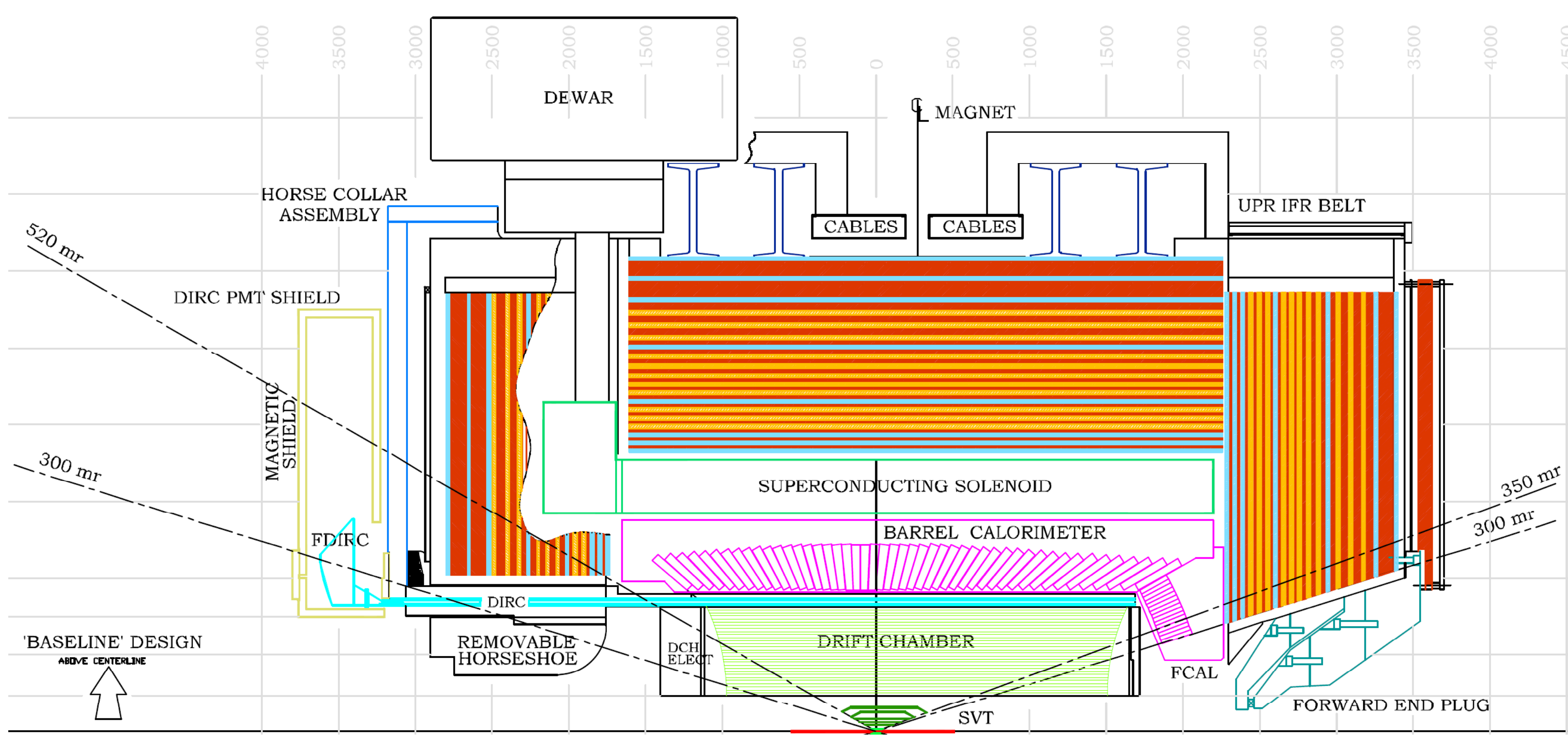


The SuperB Particle IDentification System

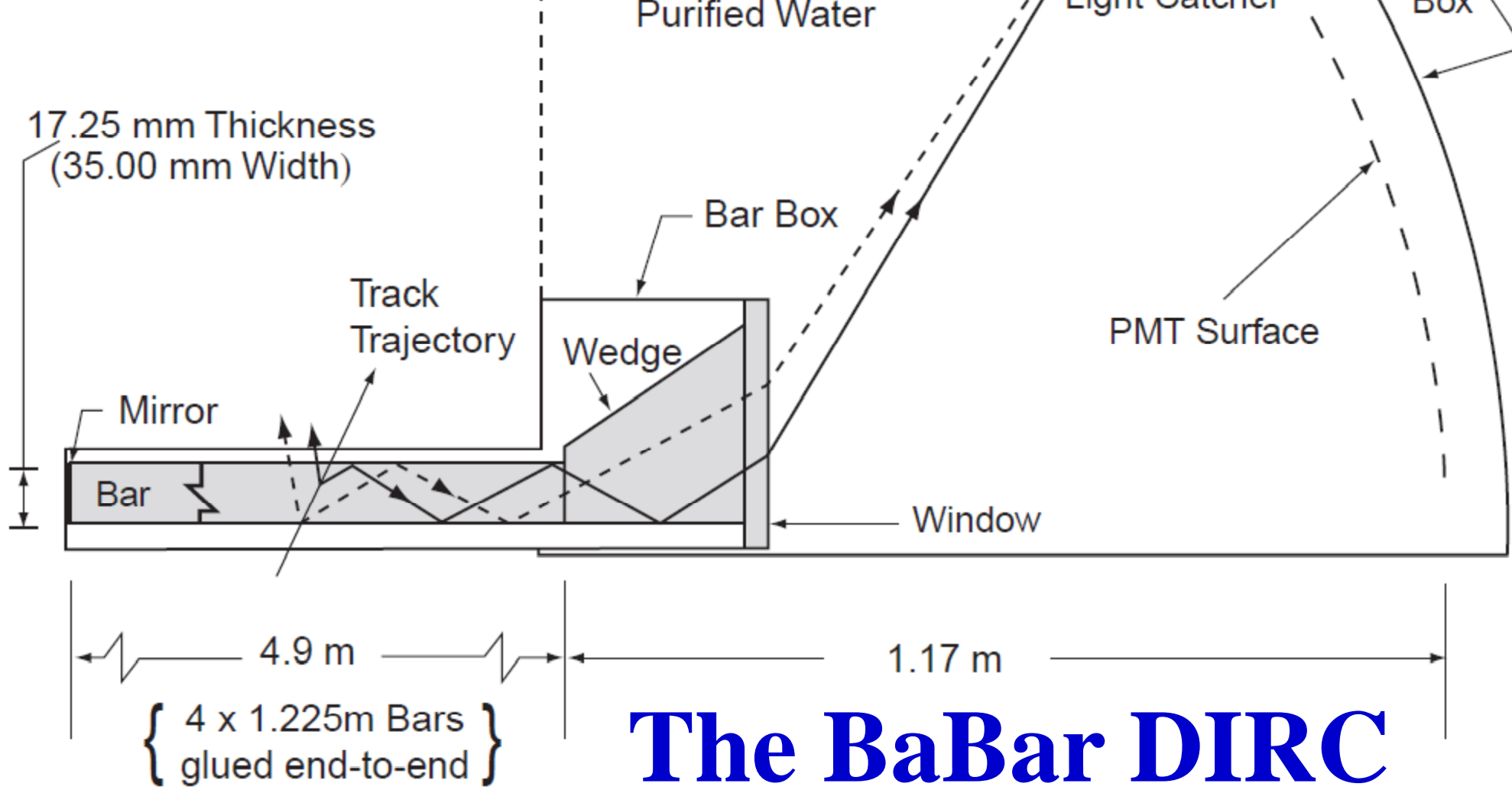
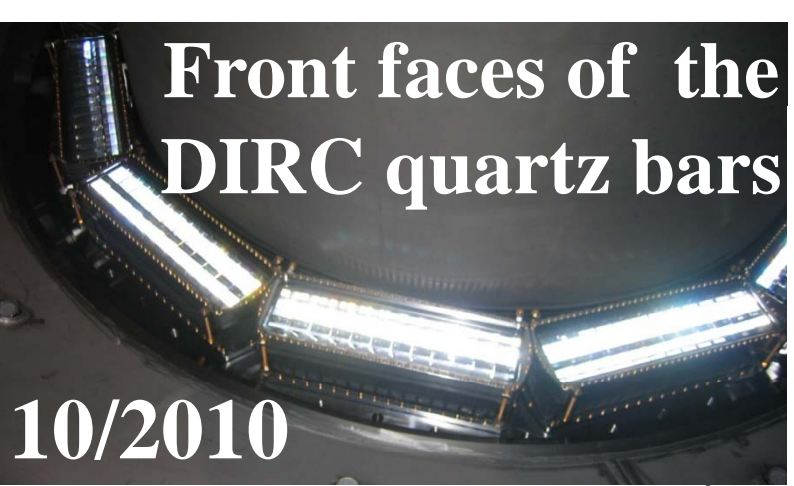
- Charged Particle IDentification (PID)
 - Key tool for SuperB physics program
- Various PID inputs
 - dE/dx from tracking systems
 - Calorimeter information
 - Instrumented flux return for muons
 - Dedicated detector to **separate π/K** based on **Cerenkov angle measurement**
 - The **SuperB PID** system
- Information combined in **multi-variate estimators**: the **PID selectors**



Side view of the SuperB detector
→ Progress Report [arXiv:1007.4241](https://arxiv.org/abs/1007.4241)

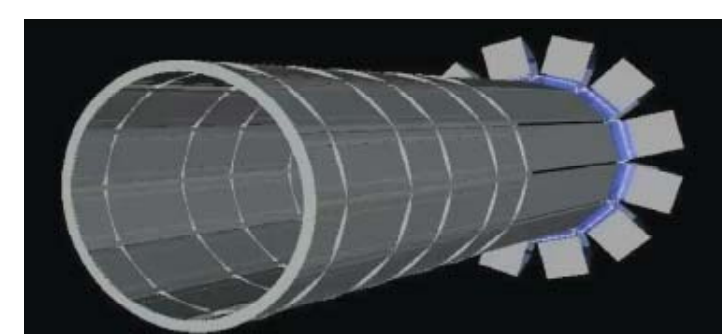
- In **barrel** region: the **F**ocusing **D**etector of **I**nternally **R**eflected **C**erenkov light (**FDIRC**)
- In **forward** region: the **F**orward **T**ime-**O**f-**F**light (**FTOF**); optional detector, R&D ongoing

- From the successful **BABAR DIRC** to the **SuperB FDIRC**



The BaBar DIRC

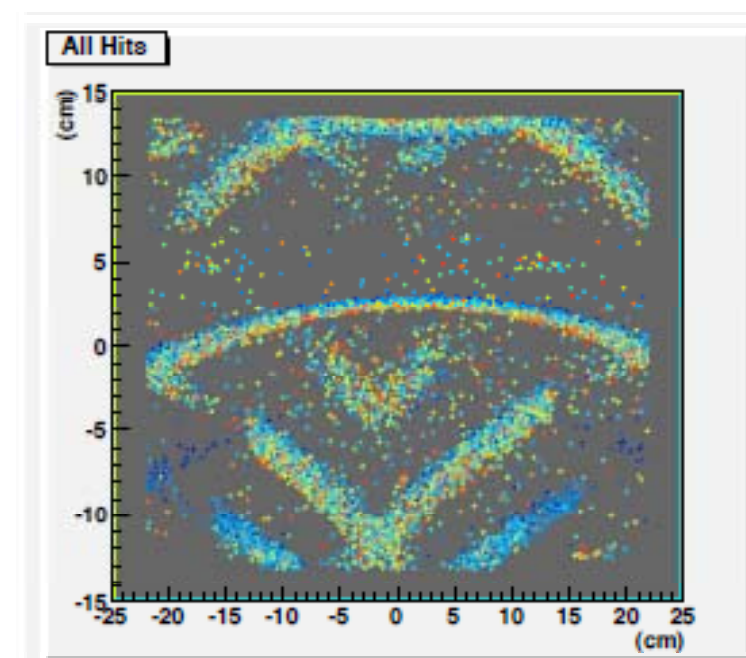
- Identical Cherenkov γ production and transport
 - **Reuse DIRC quartz bars**
- **Complete camera re-design**
 - 12 quartz blocks (Fblock)
- **576 H-8500 MaPMTs** ~ 18,500 channels
- **New fast electronics**



- **Fblock design optimization**: ray tracing + Geant4 simulation

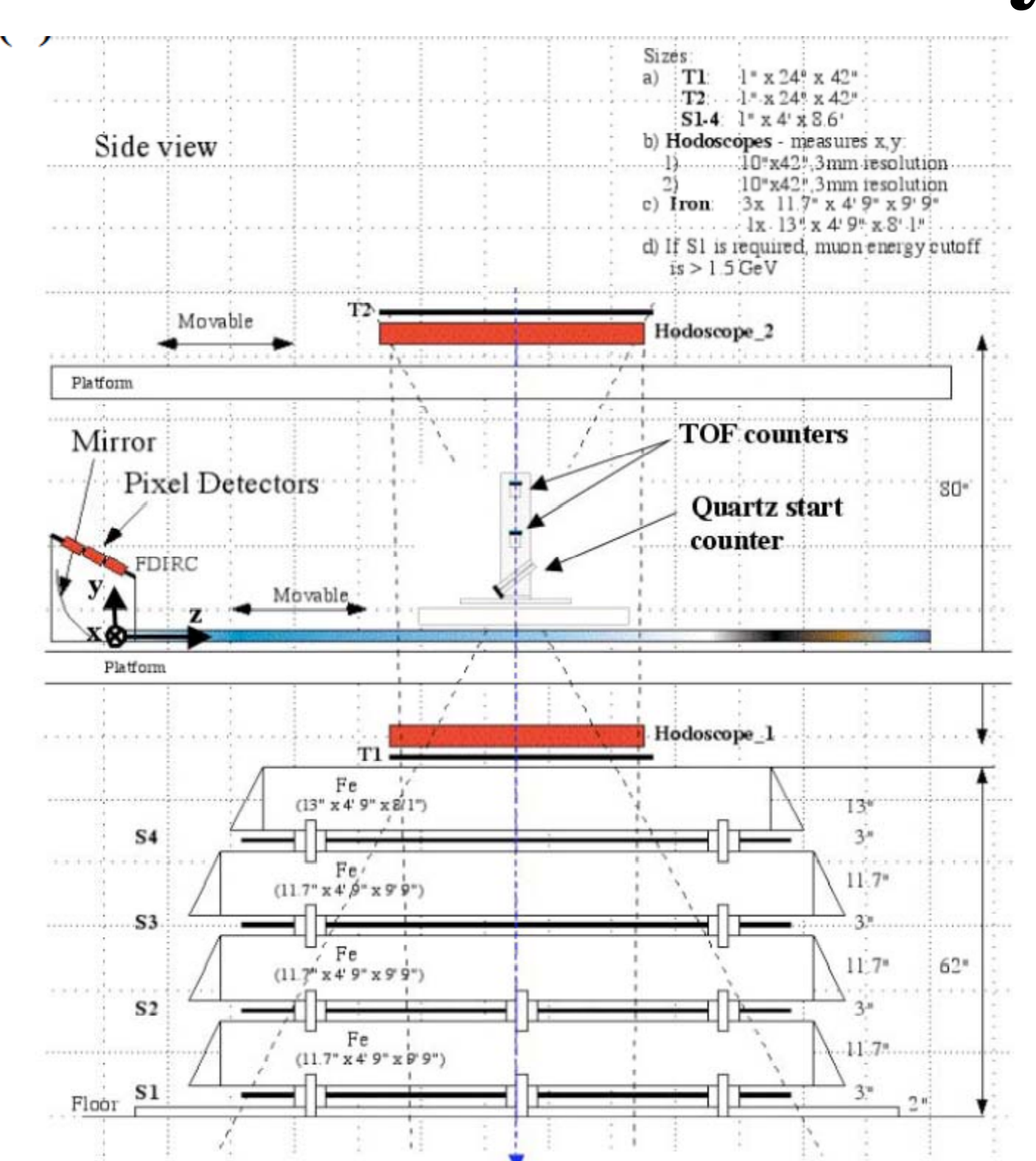
- Many **challenges** to be dealt with:

- Background, hit rate (1 MHz)
- γ ambiguities
- Optical coupling
- Integration

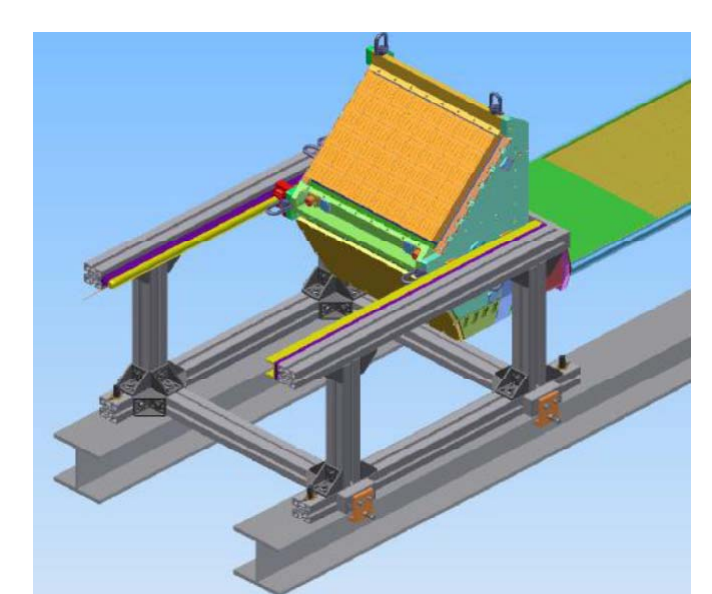
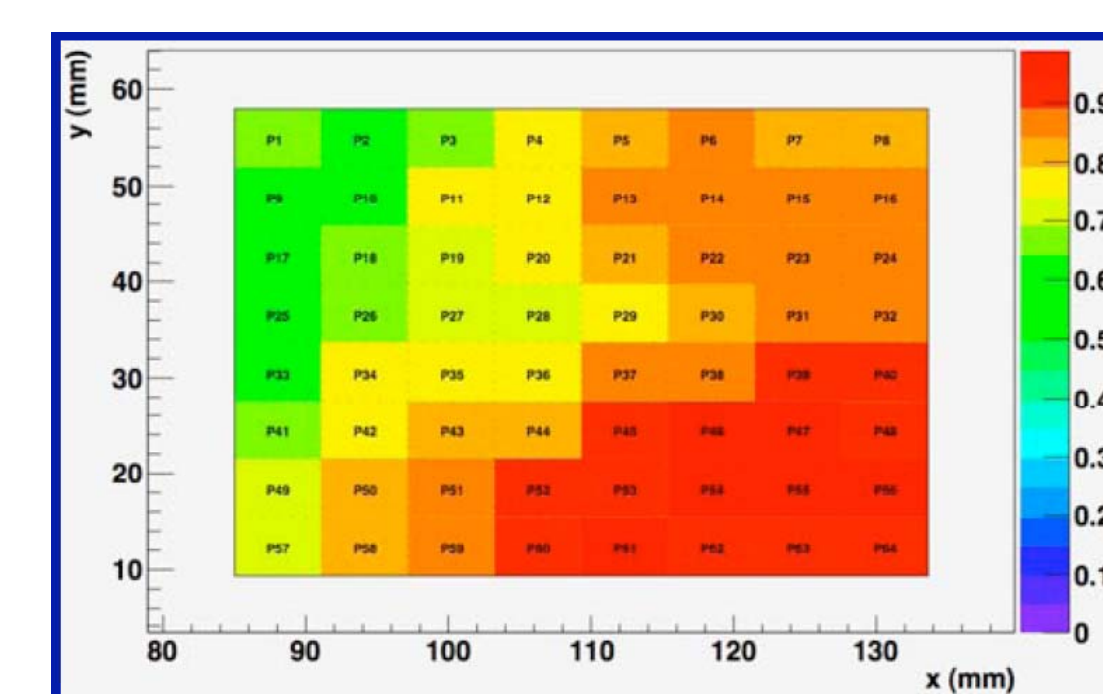
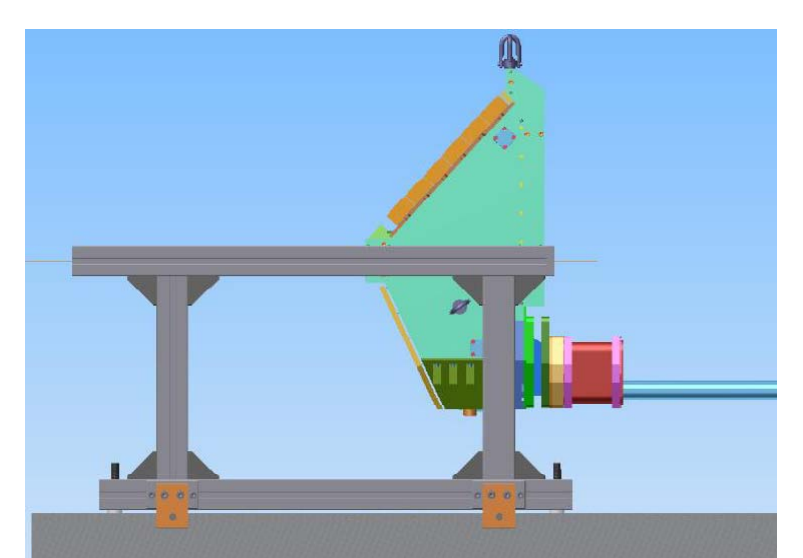


- Expected **performances**: at least as good as the BaBar DIRC with $\text{lumi} = 10^{36} \text{ cm}^{-2}\text{s}^{-1}$

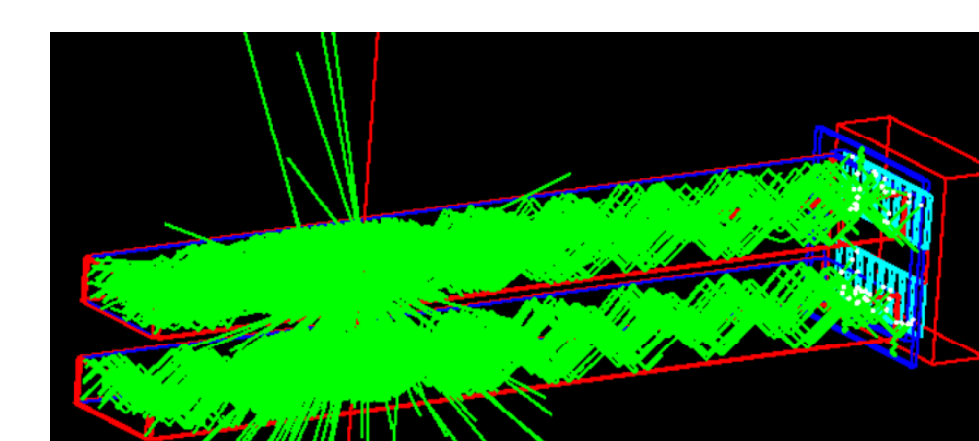
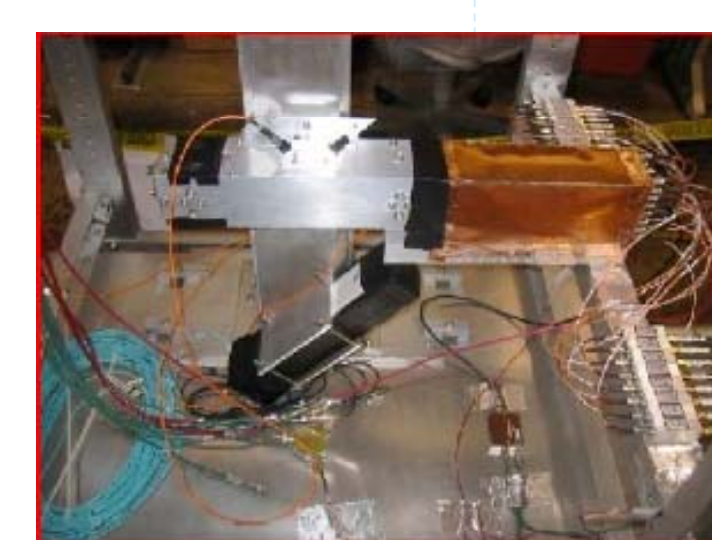
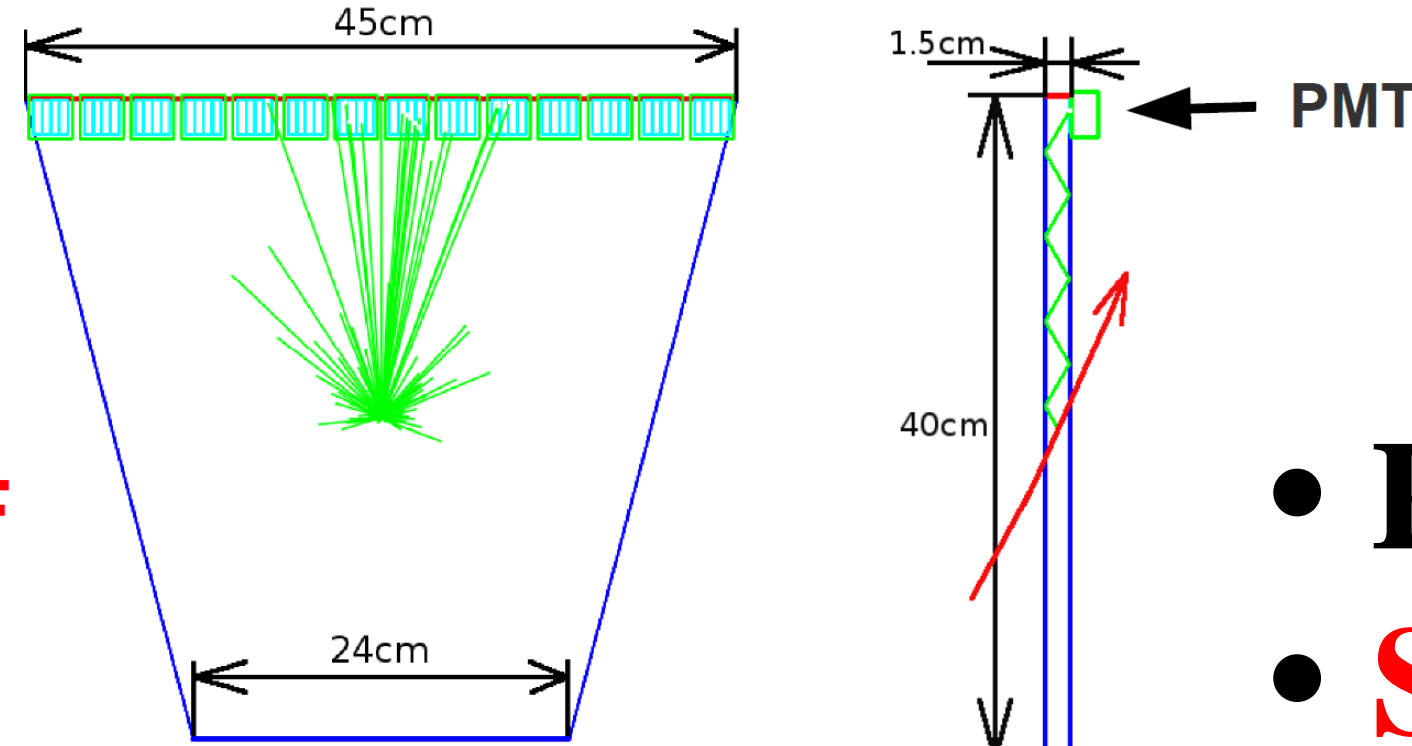
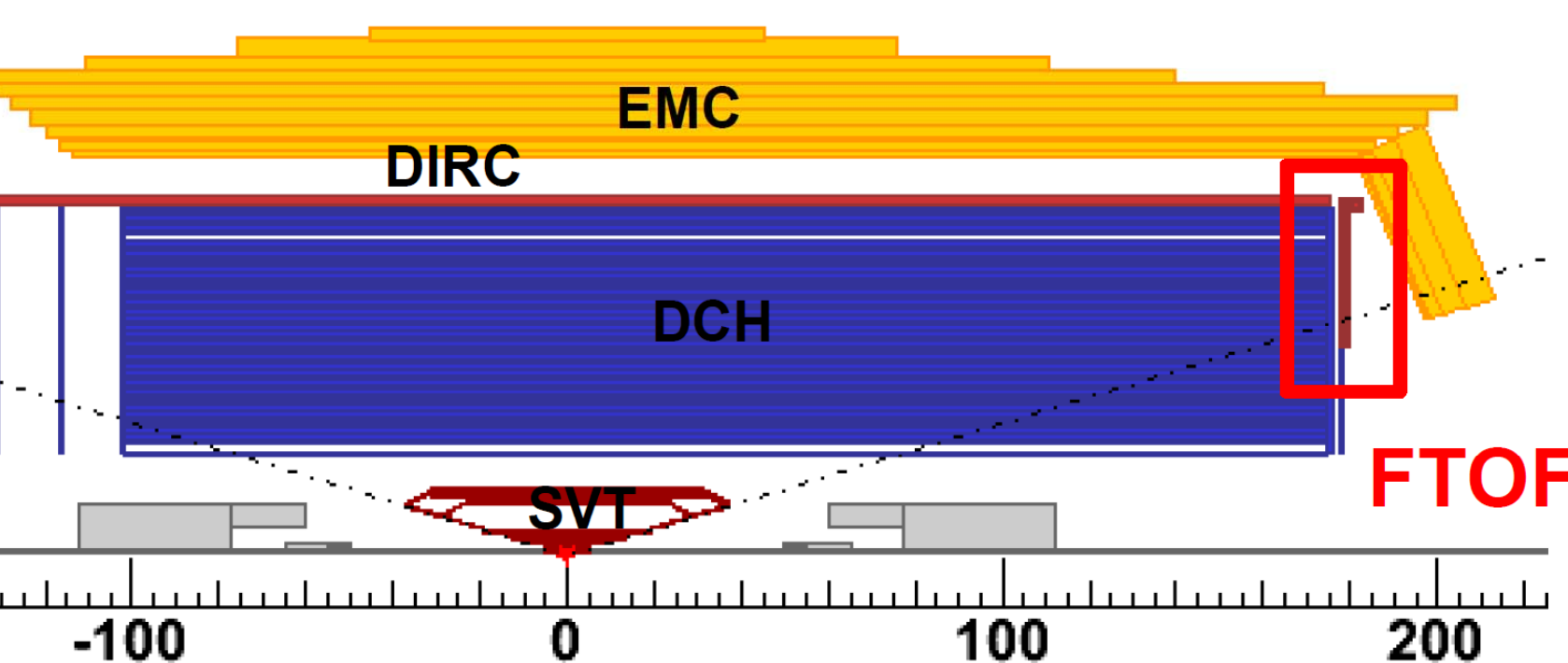
- SLAC **Cosmic Ray Telescope**
 - Main PID test facility



- **1st full-size test of a FDIRC sector to start in a few weeks**



- **FTOF**: a PID detector in the forward region
- 12 thin quartz sectors → Small X_0
- ~30 ps accuracy for π/K ID @ 3 GeV/c → **Wavecatcher FEE**



- Promising test @ CRT
- **Sector prototype in 2012**

