Testbeam schedule

Zhijun Liang
(IHEP, Chinese Academy of Sciences)

Introduction

Goal: Measurement the spatial resolution in beam test

Requirement

- **Beam type: electron/pion/proton**
- **Beam energy >2GeV**
- **Rate >1kHz**

Timeline

- **Schedule 1~2 test beam every year from 2020 to 2023**
- **2020 : Beam test for 1st MPW chip**
- **2021: Beam test for 2nd /3rd MPW chip**
- **2022: Beam test for prototype**

plans

Facility	Primary beam energy (GeV)	Particle types	Beam lines	Beam Instr.	Availability and plans
CERN PS	1–15	e, h, muon	4	Cerenkov, TOF, MWPC	Available, but reduced services during LHC commissioning
CERN SPS	10–400	e, h, muon	4	Cherenkov, TOF, MWPC	Available, but reduced services during LHC commissioning
DESY	1–6	e	3	Pixels	Available over 3 mo/yr
FNAL-MTBF	1–120	p, e, h, muon	1	Cherenkov, TOF, MWPC, Si strips, pixels	Continuous at 5% duty factor, except for summer shutdowns
Frascati	0.25–0.75	e	1		Available 6 mo/yr
IHEP-Beijing	1.1–2.5 0.4–1.2 (secondary)	e e, pion, p	3	Cherenkov, TOF, MWPC	Available in March 2008 or later
IHEP-Protvino	1–45	e, h, muon	4	Cherenkov, TOF, MWPC	Two one-month periods per year
KEK-Fuji	0.5–3.4	e	1		Available in fall 2007, for 8 mo/yr, as long as KEKB operates
LBNL	1.5; <0.06; <0.03	e; p; n	1	Pixels	Continuous
SLAC	28.5 1–20 (secondary)	e e, pion, p	1		Shutdown in 2008-2009, with uncertain plans beyond

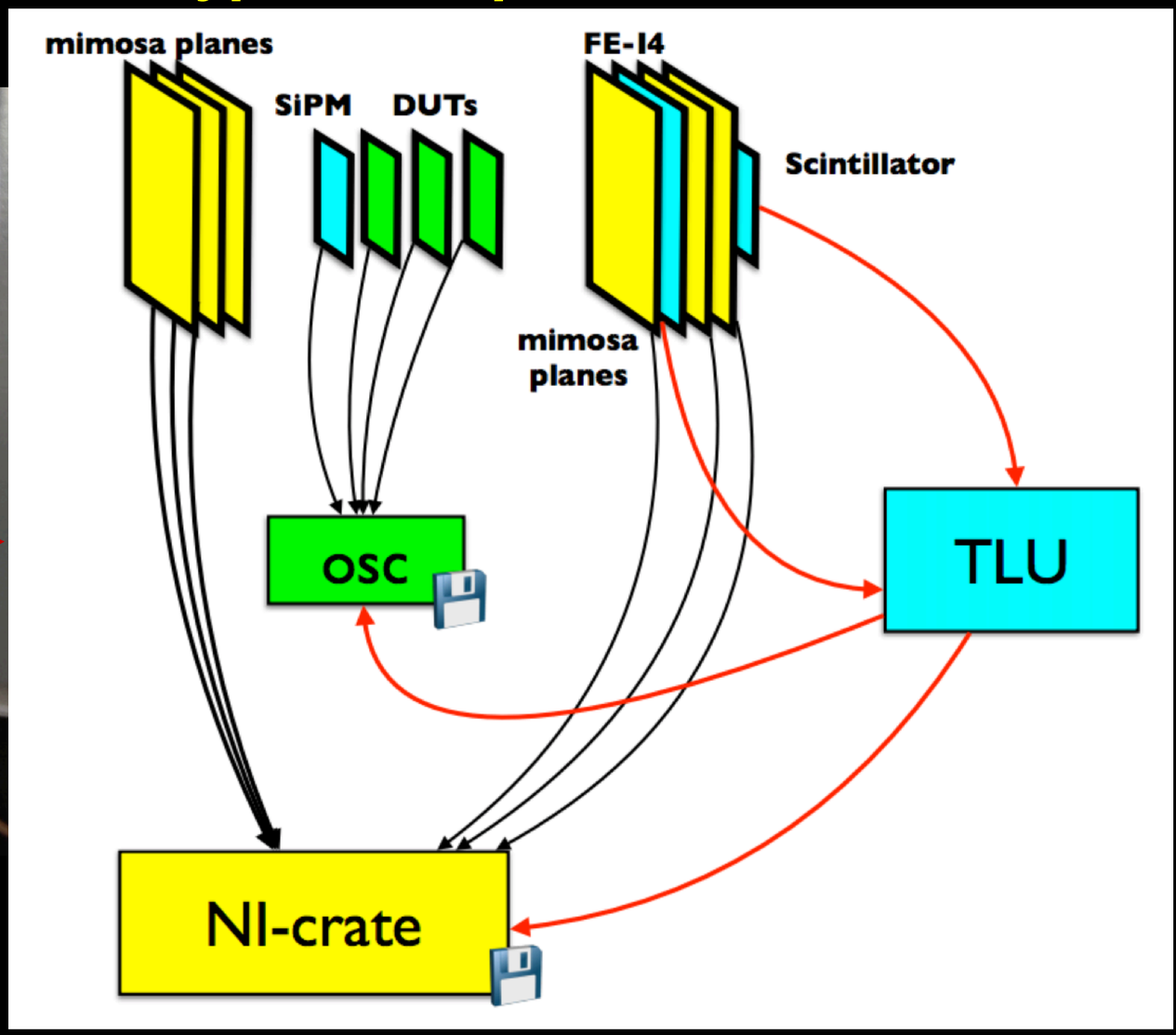
First test beam for MOST2

Expect to have first beam test on summer 2020

- **Aim to test 1st MPW chip**
- **Minosa telescope for tracking (position information)**
- **3~4GeV , 10kHz electron beam**
- **Test 2~3 chips each time**
- **Compare performance before and after irradiation**

Typical setup in DESY testbeam

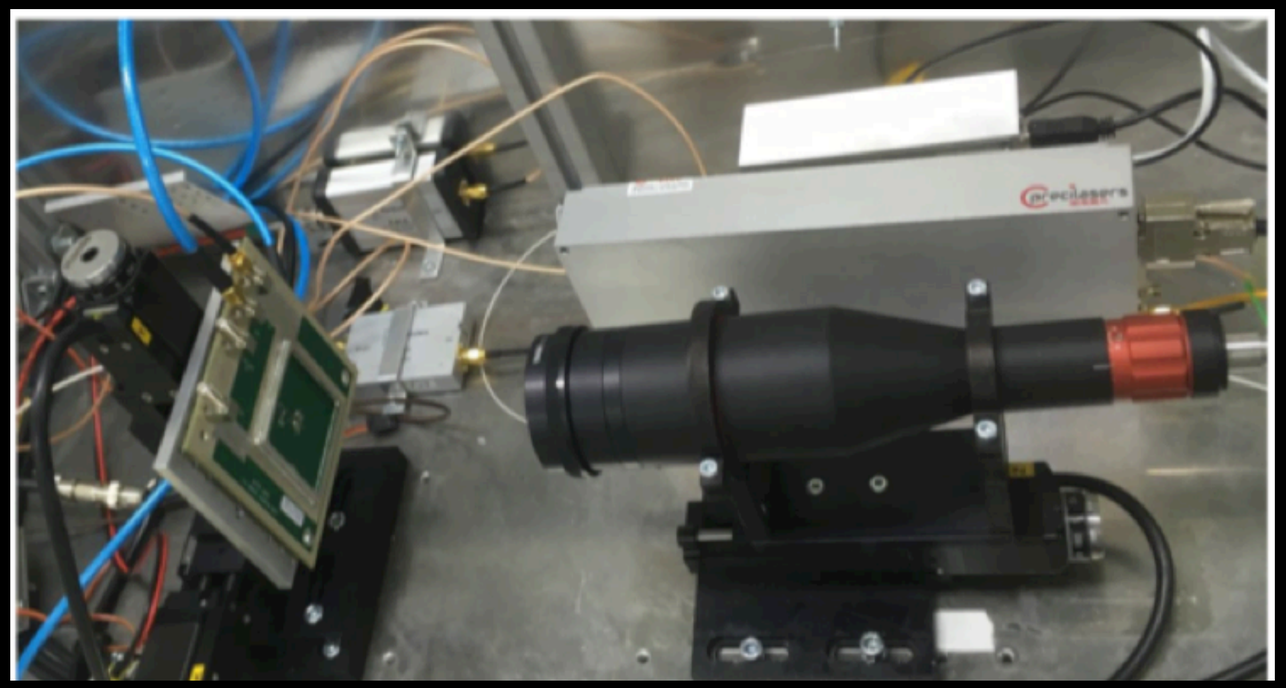
Typical setup in DESY testbeam

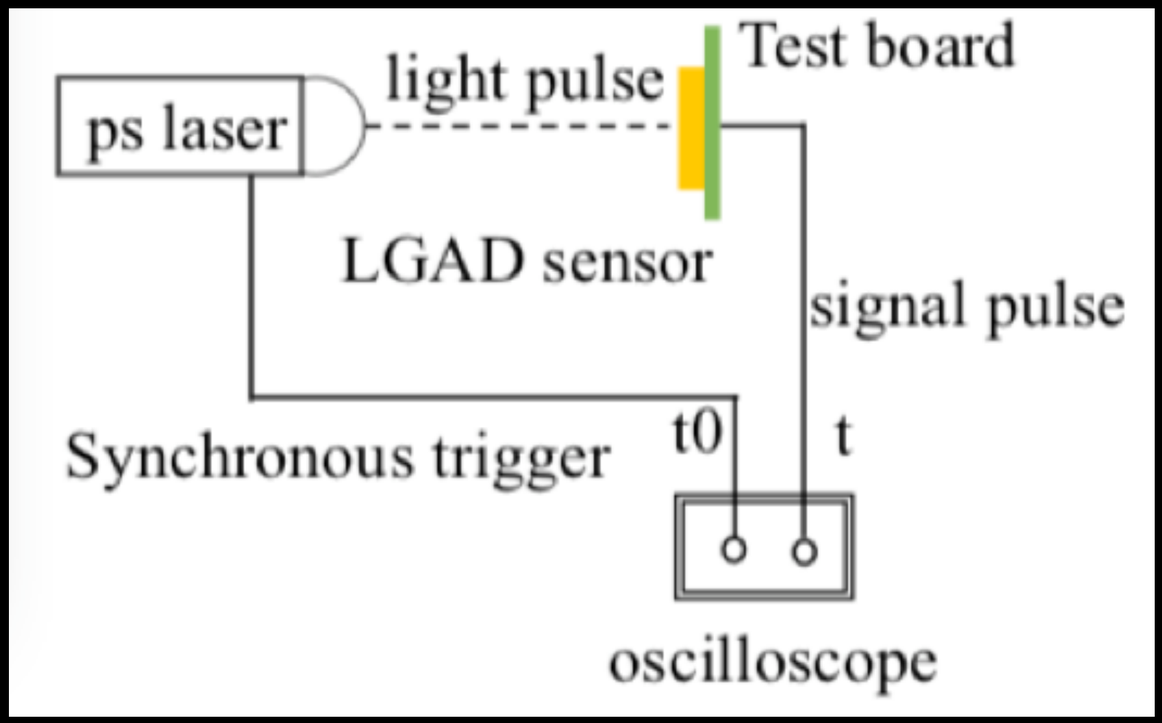


First test beam for MOST2: laser test

To prepare the beam test , we need to do laser test

- **Test trigger system, synchronize the laser trigger signal with the chip**
- **and simulate MIP response.**
- **Two pulse laser (infra-red laser)**
- **Laser Pulse Frequency can vary from 100Hz ~100kHz**

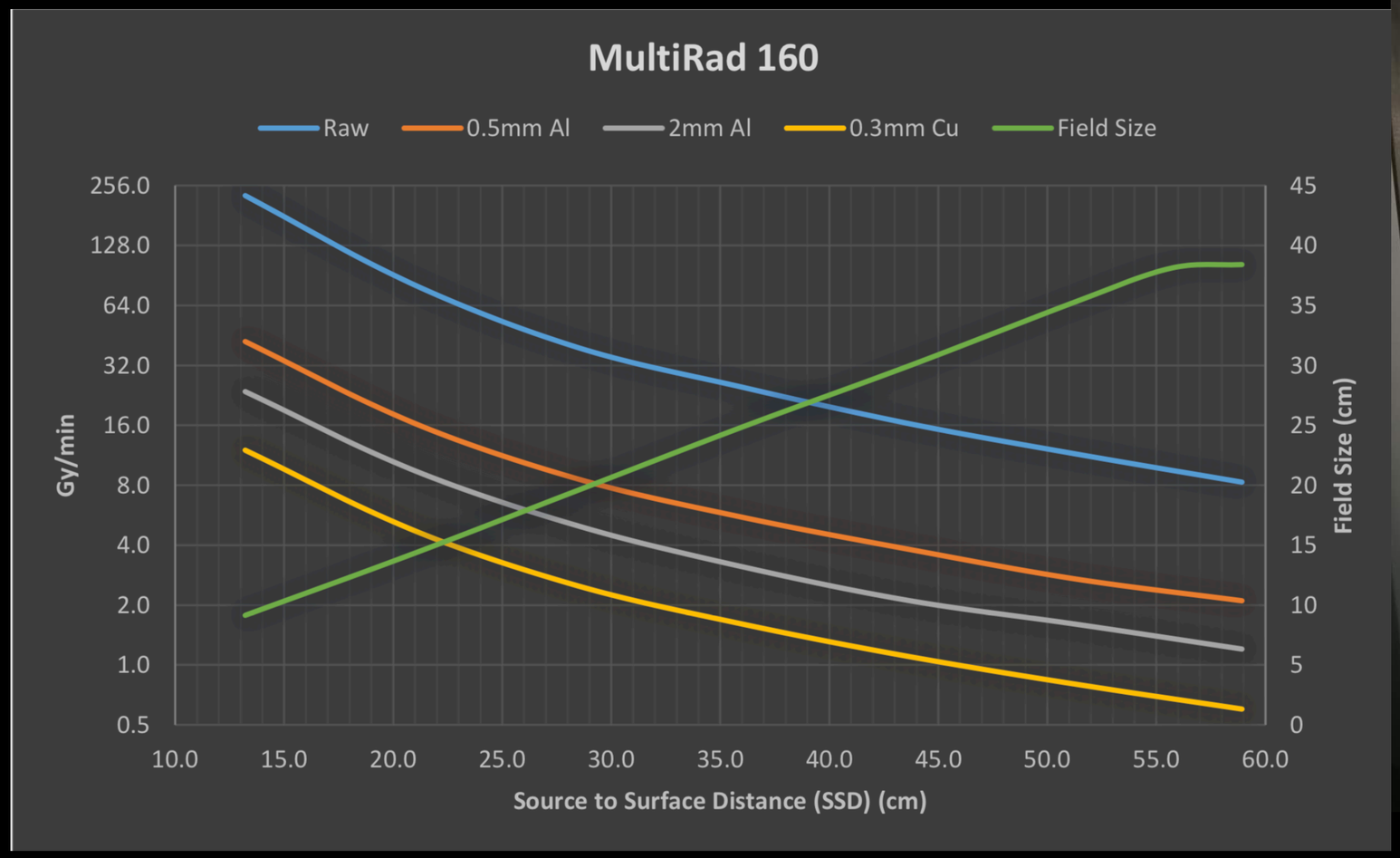


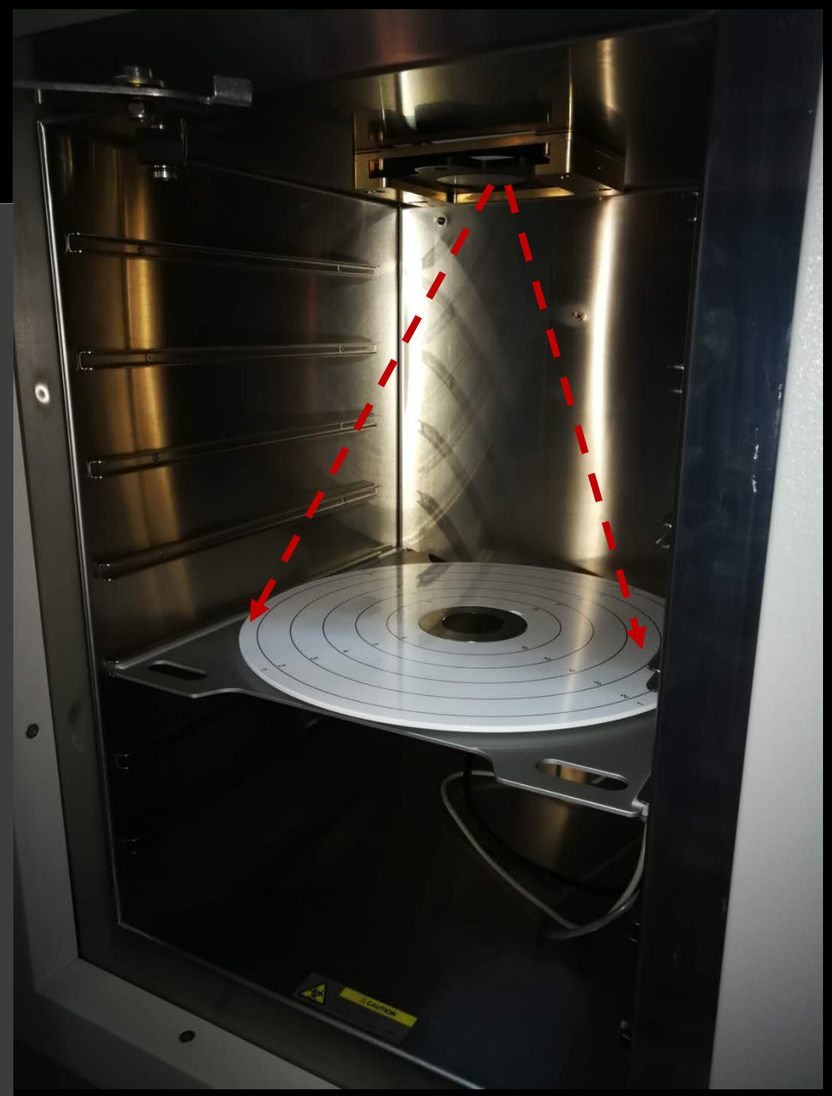


First test beam for MOST2: X ray tests

X ray irradiator in IHEP

- **Can reach 1MRad in one afternoon**



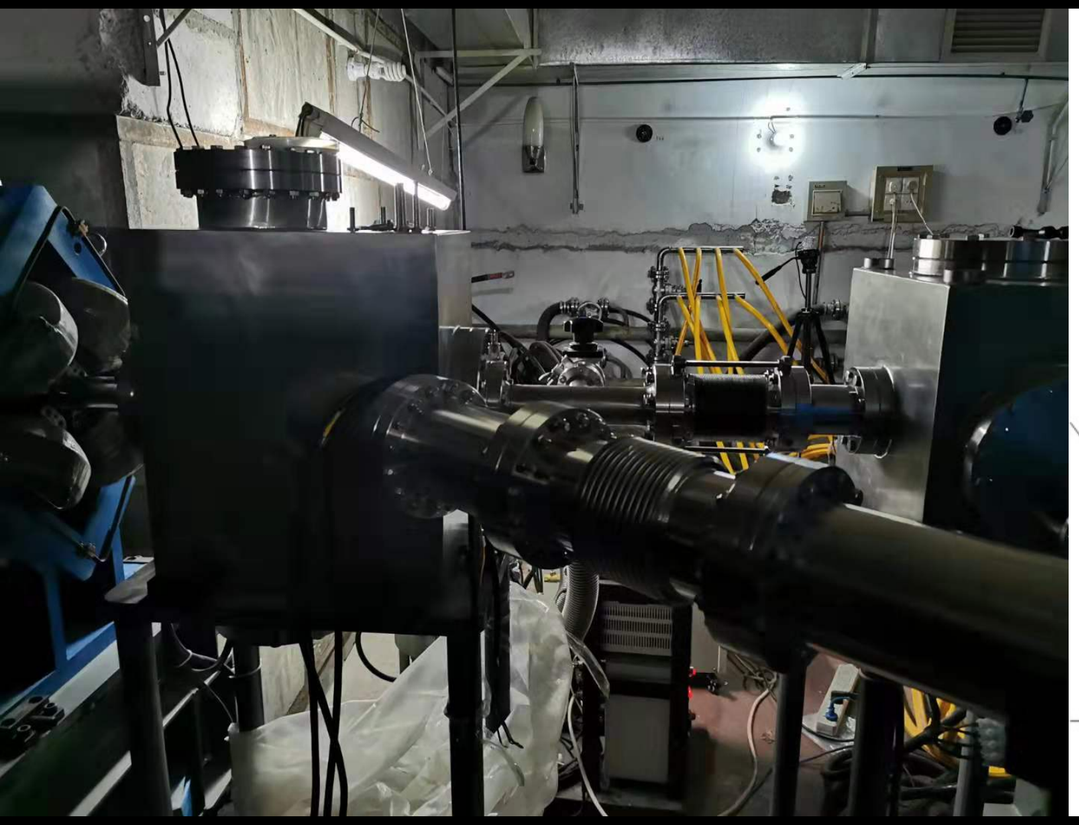


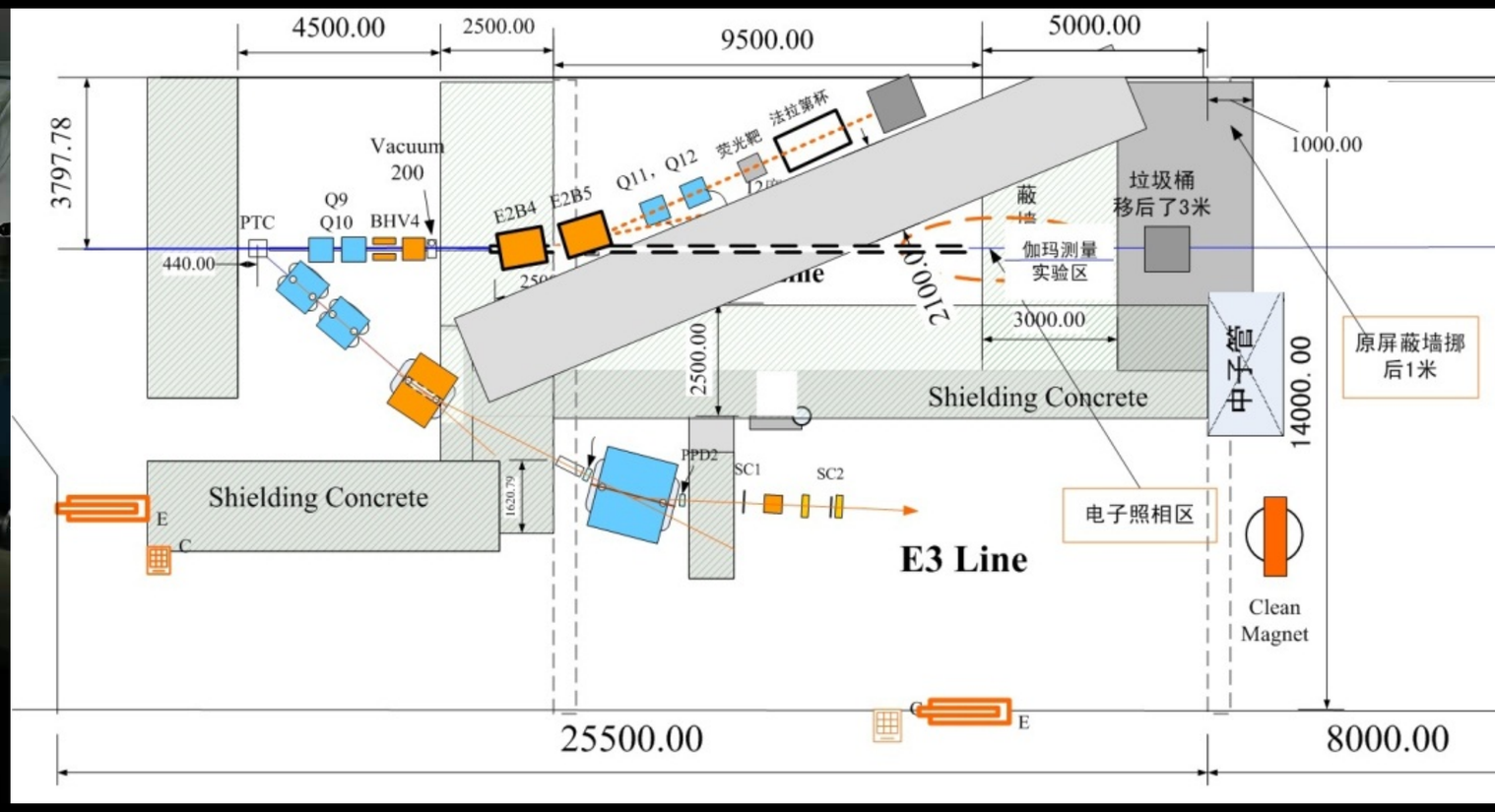
First test beam for MOST2: IHEP beam test

Two beam line available in IHEP

- **E2 line: 2.5GeV，10~20Hz, electron beam, 10^4~10^9 electrons per bunch**
- **E3 line: 1~2GeV, 1~4Hz, electron/pion/K, single particle**

Plan to use E3 line for some beam test

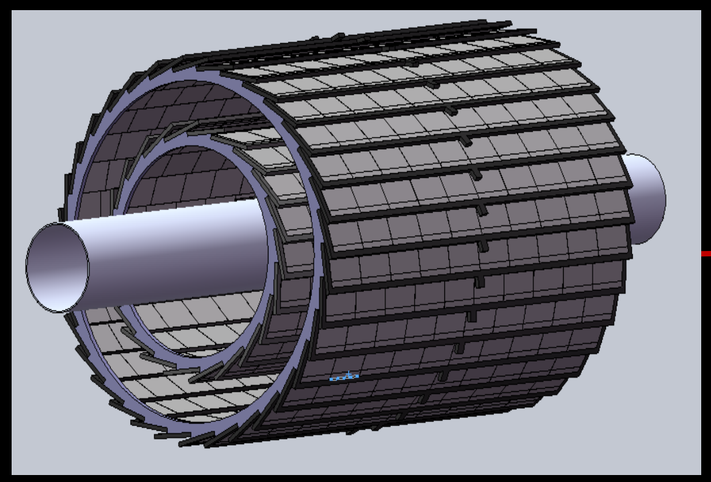


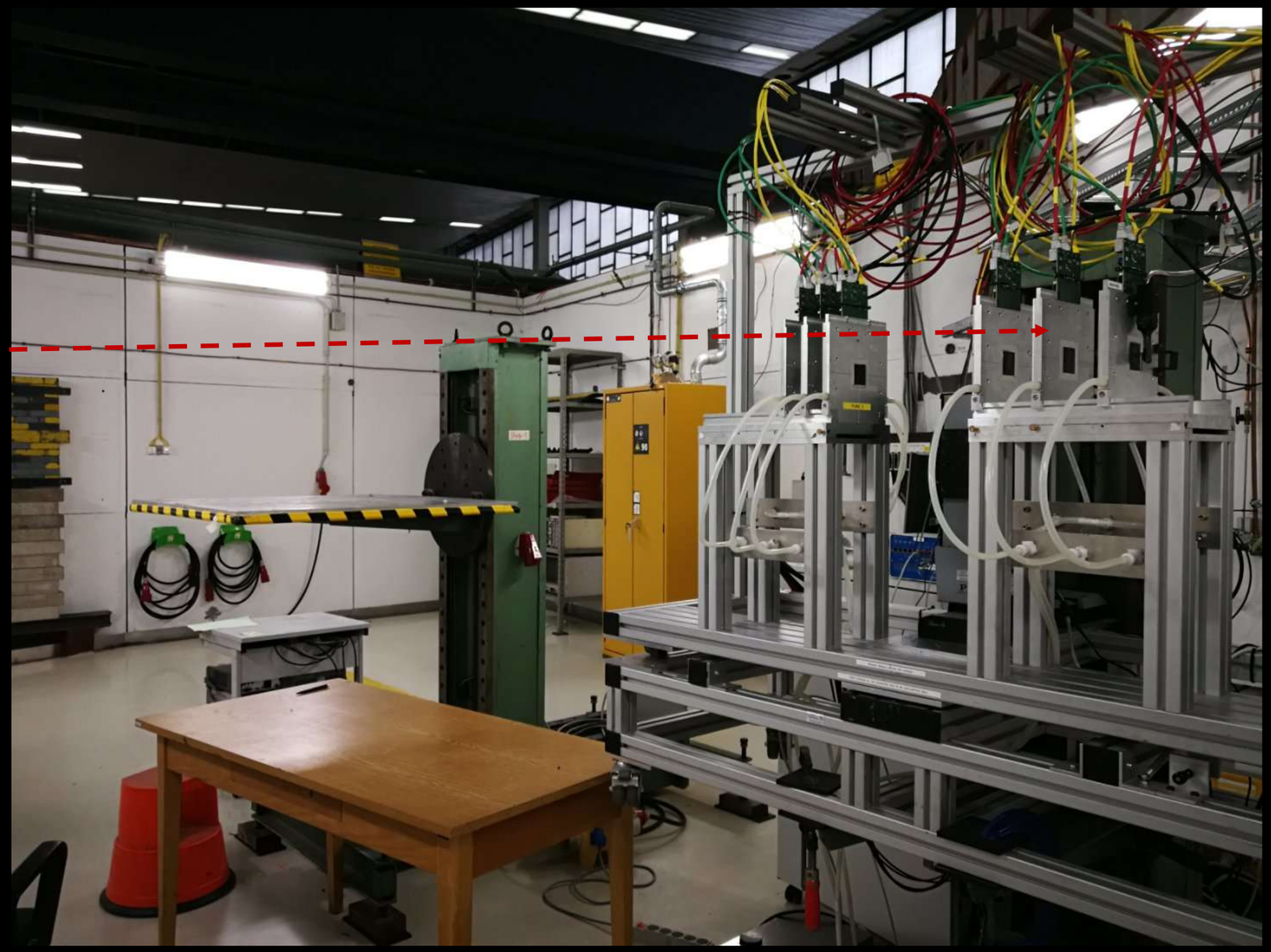


Test beam for prototype

Two possibilities

- **3~4GeV , 10kHz electron beam in DESY**
- **Standalone tracker prototype**
- **tracker prototype + Minosa telescope combined tracking**





Summary

Expect First beam test in DESY in summer 2020

- To prepare for it :
- Laser test
- IHEP beam test
- X ray irradiation
- Proton irradiation

Timeline

- Schedule 1~2 test beam every year from 2020 to 2023
- 2020 : Beam test for 1st MPW chip
- 2021: Beam test for 2nd /3rd MPW chip
- 2022: Beam test for prototype