Work summary for 3rd quarter (July ~ September) 2018

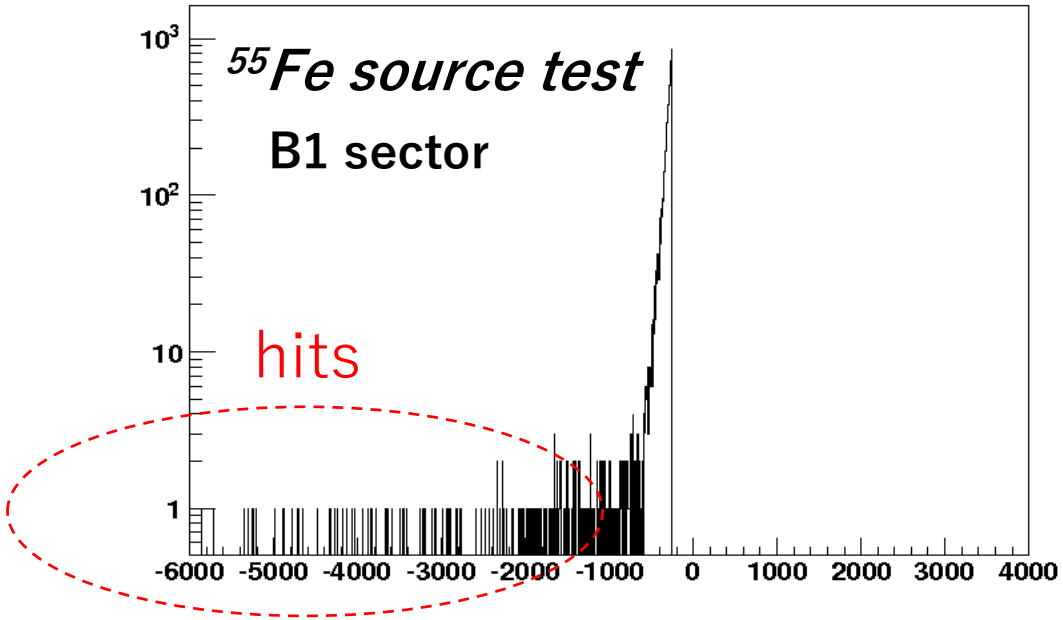
Ryuta Kiuchi

10/01/2018

CEPC Pixel Sensor : JadePix1

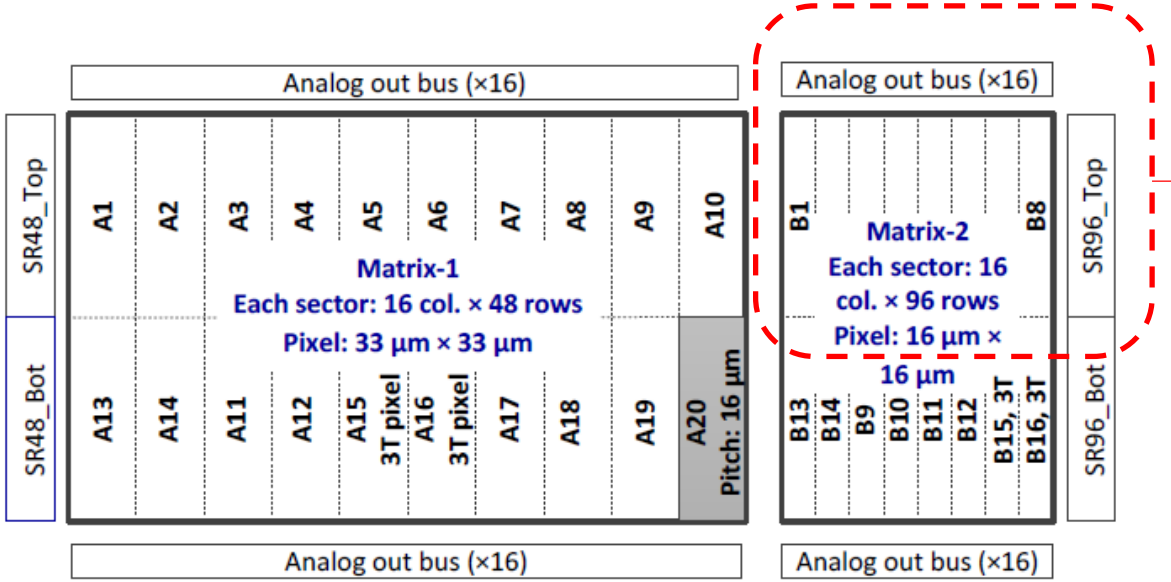
[Preparation for the beam test @ DESY]

-- Development of the firmware for “B-matrix”



ADC (after CDS) distribution

New sectors !



附件 2：Matrix-2 子阵列参数

Sector	*Diode surface*	*Footprint*	*Structure*
B1	3 µm^2	20 µm^2	2T_nmos
B2	4 µm^2	20 µm^2	2T_nmos
B3	8 µm^2	20 µm^2	2T_nmos
B4	3 µm^2	15 µm^2	2T_nmos
B5	4 µm^2	15 µm^2	2T_nmos
B6	8 µm^2	15 µm^2	2T_nmos
B7	3 µm^2	11 µm^2	2T_nmos
B8	4 µm^2	11 µm^2	2T_nmos

parameters

Beam Test @ DESY - I.

Place

-- DESY test beam line , T22 , ~ 4GeV electron beam

Schedule

-- Preparation/Assembly at DESY : August 20 -

-- Beam time : 27th Aug. - 2nd Sep.

Detector

-- JadePix1 (DUT) + MIMOSA26 (telescope)

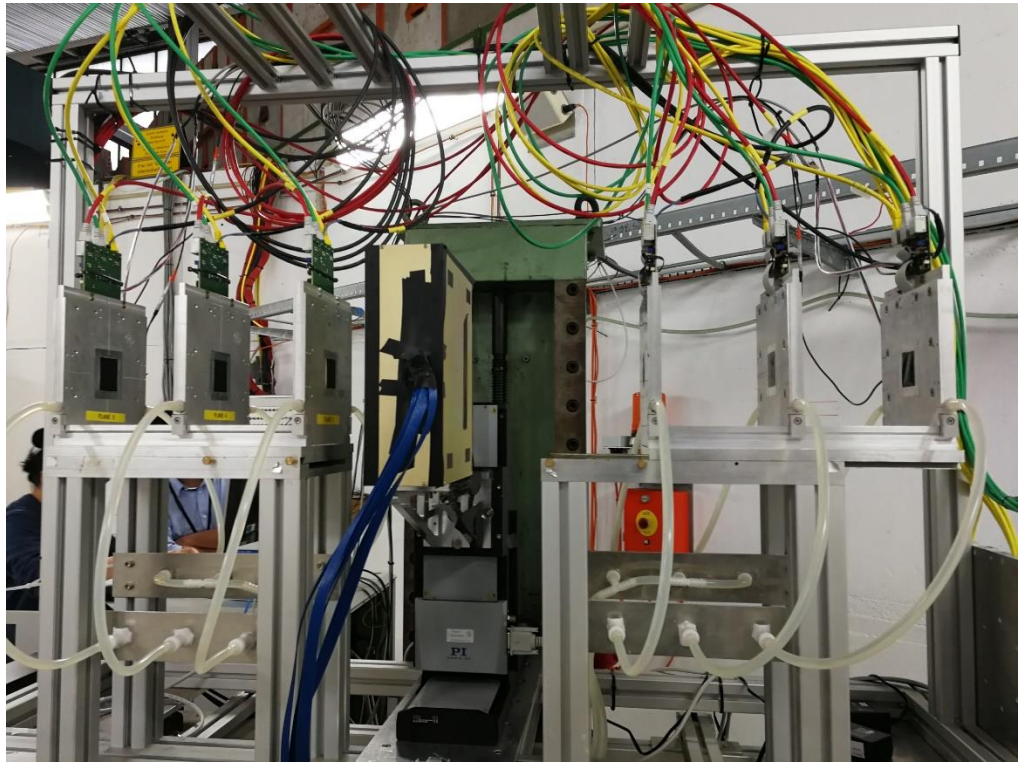
Excel Online

OneDrive

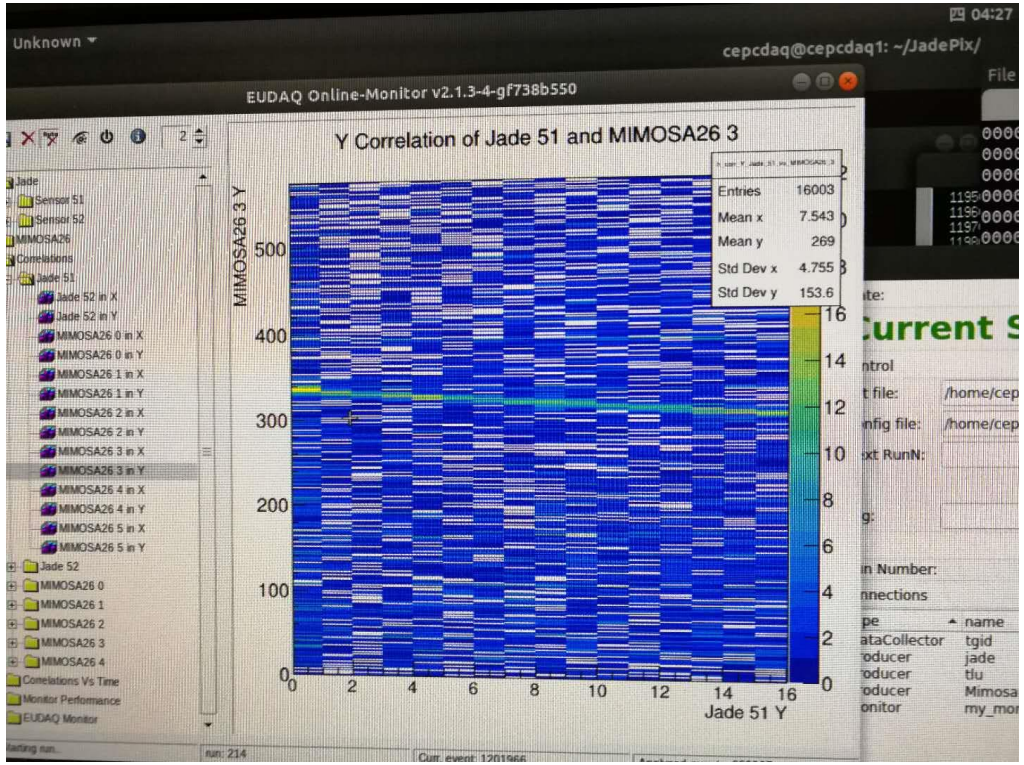
	A	B	C	D
1	Date	8:00 - 16:00	16:00 - 24:00	24:00-8:00
2	2018/8/27 (Mon)	ALL	Hongbo, Jia	Xin, Liejian
3	2018/8/28 (Tue)	Hongbo, Jia	Xin, Shuo	Liejian, Chenfei
4	2018/8/29 (Wed)	Hongbo, Yifan	Jia, Ryuta	Liejian, Chenfei
5	2018/8/30 (Thu)	Hognbo, Xiaocong	Liejian, Jia	Ryuta, Chenfei
6	2018/8/31 (Fri)	Liejian, Yifan	Jia, Chenfei	Ryuta, Hongbo
7	2018/9/1 (Sat)	Chenfei, Xiaocong	Liejian, Ryuta	Hongbo, Jia
8	2018/9/2 (Sun)	Chenfei, Xiaocong	Liejian, Ryuta	Hongbo,Jia

From a shift table

Beam Test @ DESY - II. photograph



Setup : Jadepix1 located at the center of the telescope



Online Monitor:
Correlation between the DUT (Jadepix1) & the telescope

CEPC analysis : Higgs->ZZ*

-- ZH->Z(->μμ) H(->ZZ*->ννqq) analysis for the CEPC_v4

-- Arrange the code structure

-- First, followed the analysis which was done for CEPC_v1

-- Then, have investigated the cut condition etc., since the background events was not efficiently dropped by the initial analysis condition.

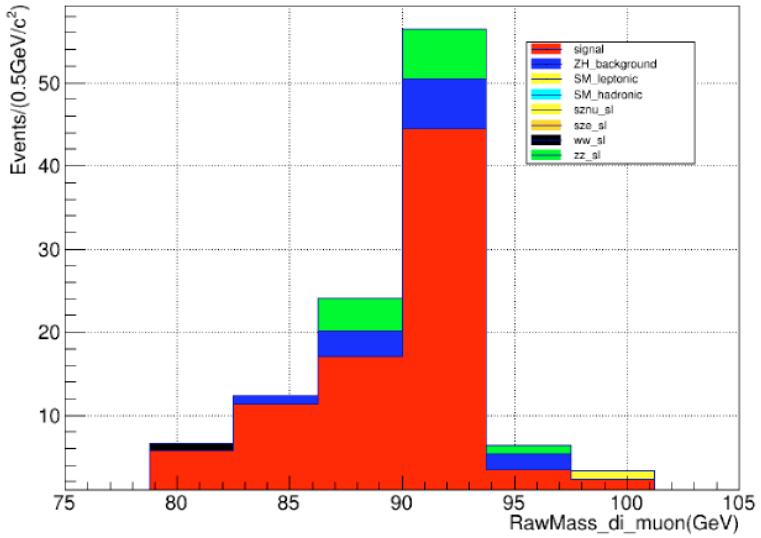


图 4.10 经事例选择后的信号事例和本底事例在正负缪子不变质量谱上的分布

Reference figure: di-muon invariant mass after all of the cuts.

Cut Flow Table(signal vs ZH)

for confirmation

ffH(->inculive)

H(->exclusive) samples

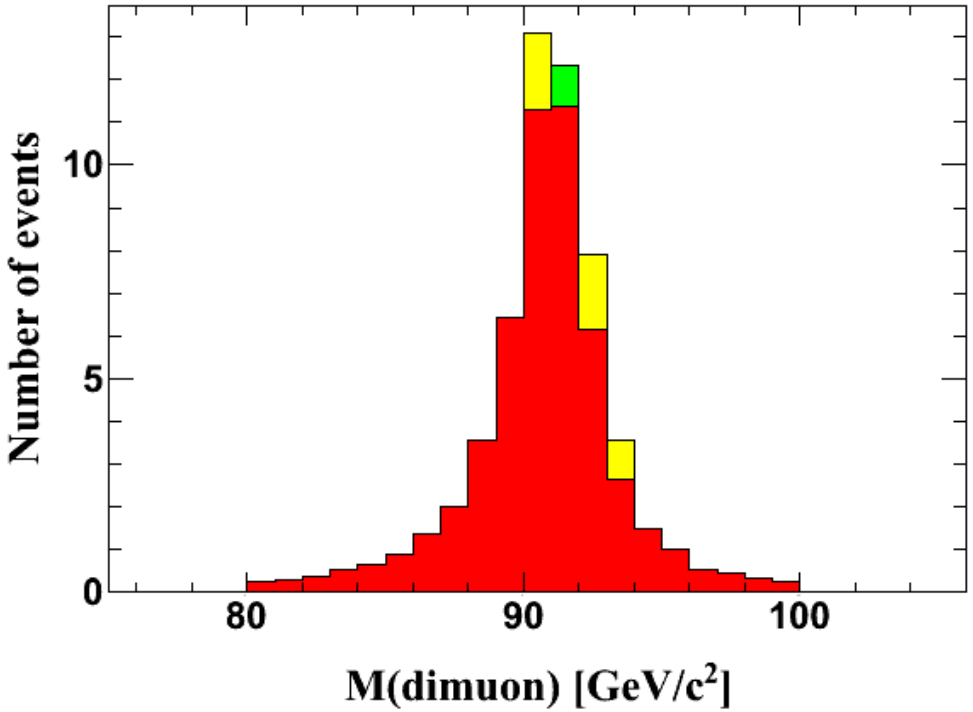
	Signal (->ZZ*)	ZH	μμH (->WW*)	μμH (->ττ)	ννH (->ZZ*)	μμH (->ZZ*)
Missing mass> M(di-jets)	145	3336	889	1182	212	145
80 < M(dimuon) < 100	133	2063	776	1063	110	131
120 < RecM(dimuon) < **135**	118	1783	668	951	42	116
N(pfo) >15	99	553	320	154	37	96
Pt(total visible) > 10	93	502	299	132	36	92
Min angle > 0.3	87	455	281	120	33	85
Missing Mass & M(dijets)	61	70	13	9	29	60
Pt(jet1) > 3 & Pt(jet2) > 3	54	55	11	3	26	52
N(lepton)<3 (==2)	52	55	9	2	25	50

Cut Flow Table (signal vs bg)

	Signal	SM lep.	SM had.	sznu_sl	sze_sl	ww_sl	zz_sl
Missing mass> M(di-jets)	145	1176076	144	5	0	1683	2435
80 < M(dimuon) < 100	133	601787	0	0	0	174	886
120 < RecM(dimuon) < **135**	118	39245	0	0	0	48	174
N(pfo) >15	99	1513	0	0	0	48	173
Pt(total visible) > 10	93	235	0	0	0	48	30
Min angle > 0.3	87	98	0	0	0	13	28
Missing Mass & M(dijets)	61	35	0	0	0	0	3
Pt(jet1) > 3 & Pt(jet2) > 3	54	5	0	0	0	0	1
N(lepton)<3 (==2)	52	4	0	0	0	0	1

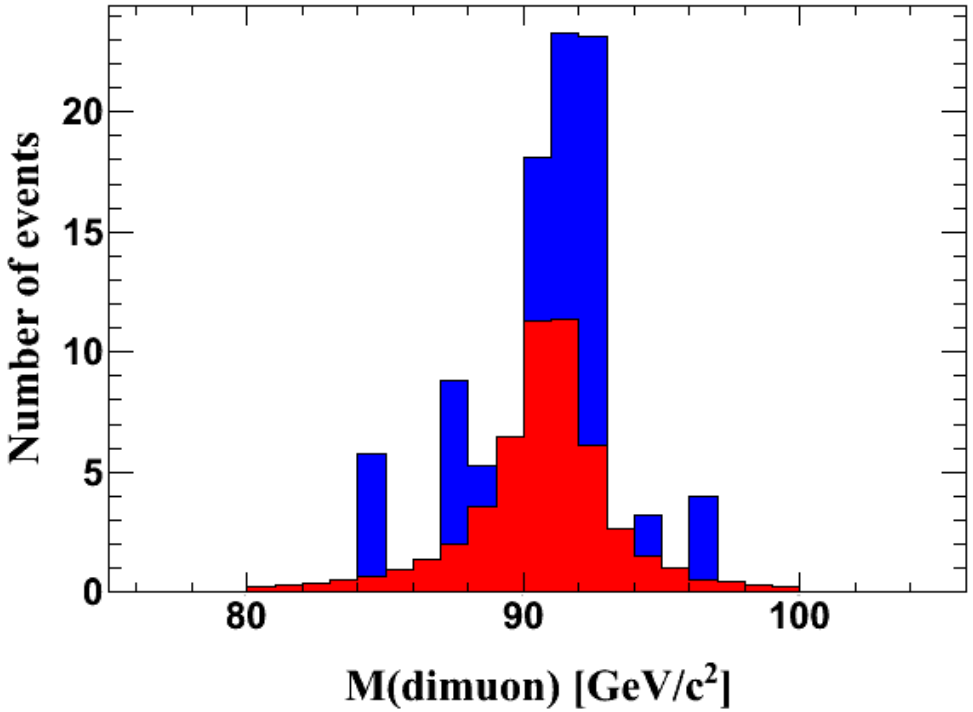
Comparison of di-muon Invariant Mass

Only Signal (Red) & BGs (without ZH) are stacked here.



Signal : Bg~ 10 : 1

Only Signal (Red) & ZH(Blue) are stacked here.



Signal : ZH ~ 1 : 1 ....

It is a first step to see the Signal & Bg. ratio.

The other works

-- Attend the meetings for the development of LGAD detectors

-- Attend the JPS 2018 meeting held at Japan