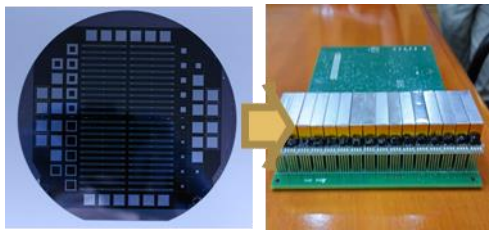
SILICON DETECTOR R&D
:실리콘 반도체 검출기 연구실

박사과정 이승철

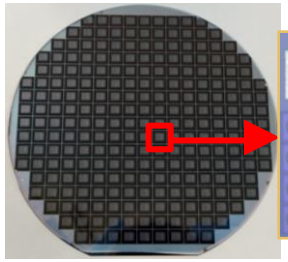
하전 입자, 광자 등 입자 검출 → 이미징, 입자 궤적 및 버텍스 측정



어레이 광센서

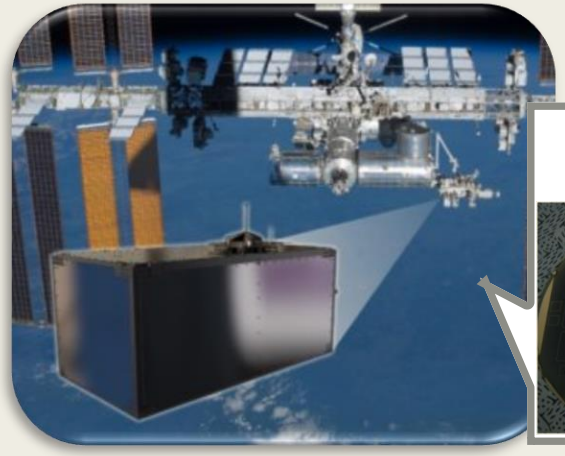
항만용 X-ray 컨테이너 검색기

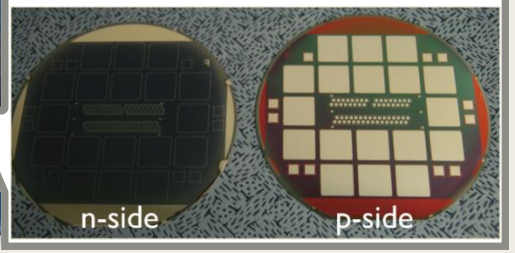
Mammography



JFET 픽셀 센서

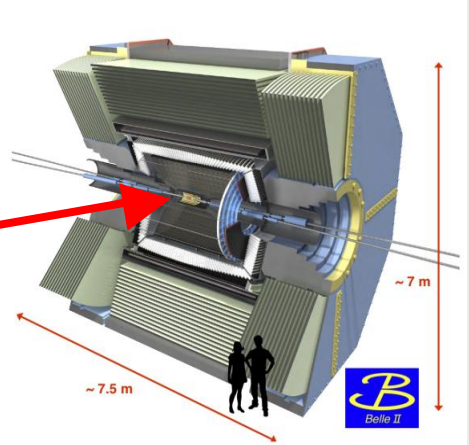
의학용 이미지 센서





패드 광센서

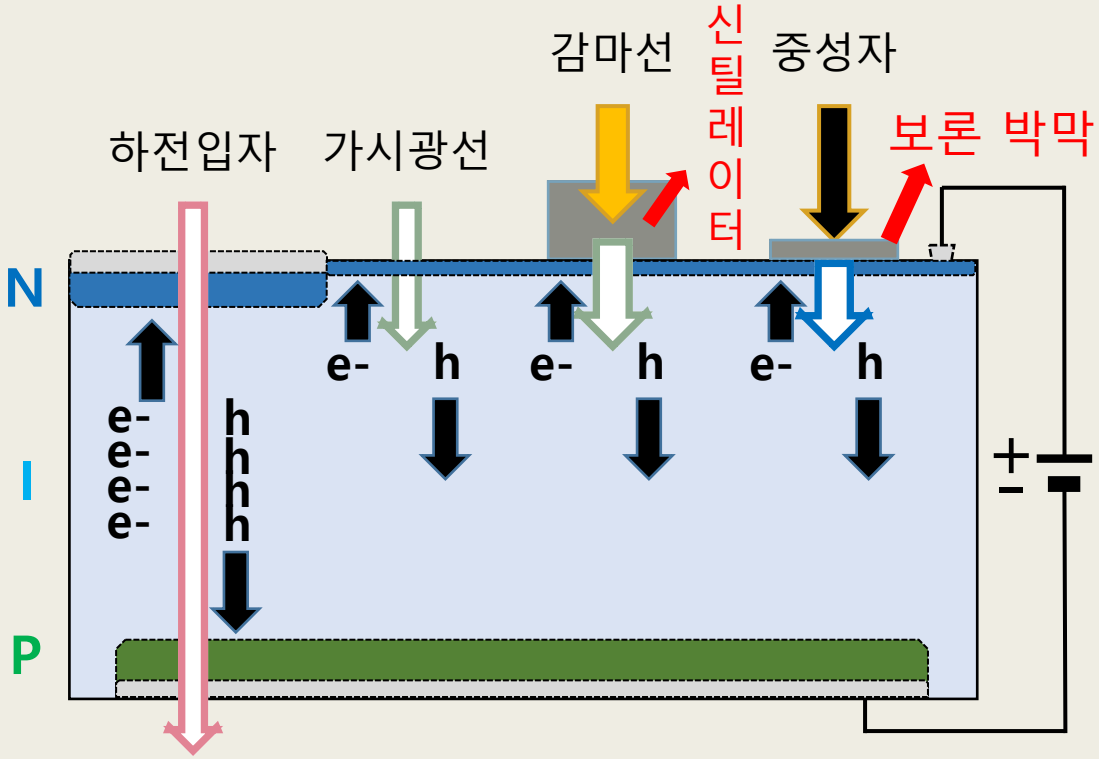
천체 물리학: 우주선 측정



고에너지 물리학: 궤적/버텍스 관측

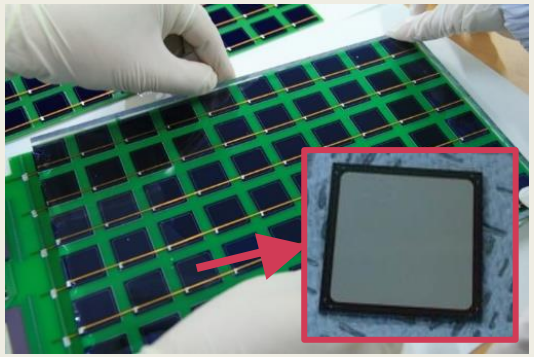
실리콘 반도체 검출기

■ 센서 기본 구조: **P-I-N**

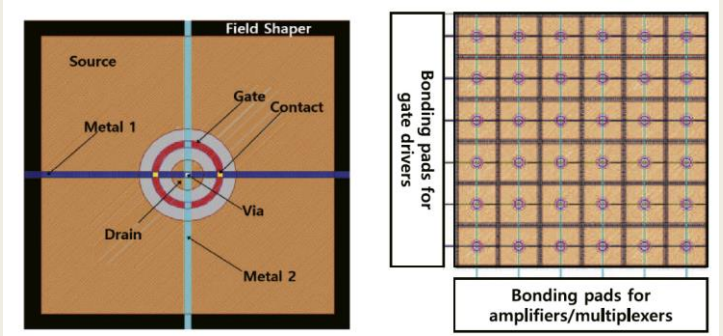


실리콘 검출기 고유의 장점
+ 다양한 변환 물질과 결합 가능
→ 뛰어난 범용성

■ 종류



단일 패드 센서



픽셀 센서

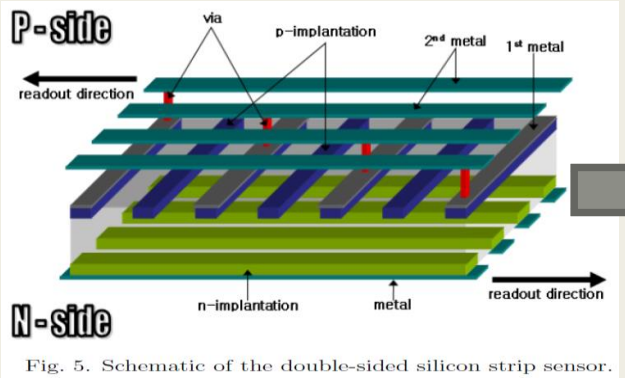
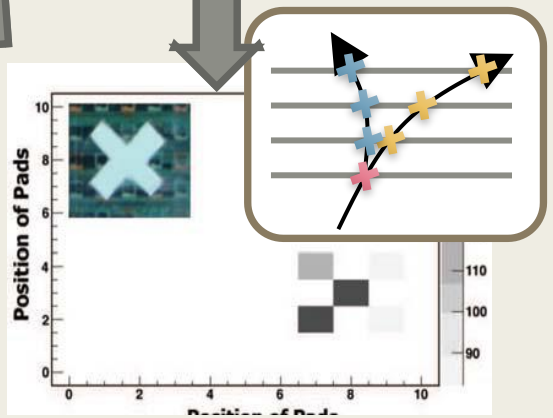


Fig. 5. Schematic of the double-sided silicon strip sensor.

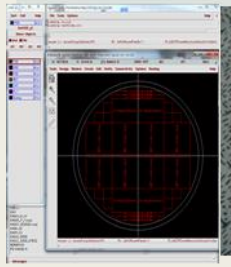
스트립 센서

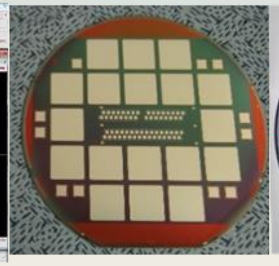


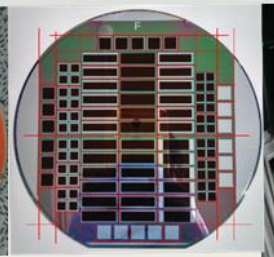
2D 위치 정보 획득

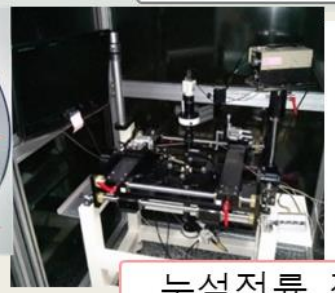
검출기 개발 과정

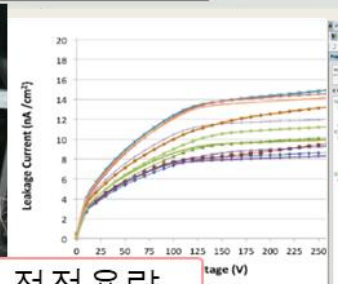
설계 → 제작 → 다이싱 → 전기적 특성 조사 → 전기적 연결



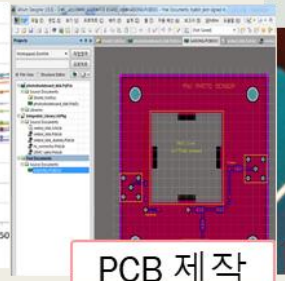








누설전류, 정전용량

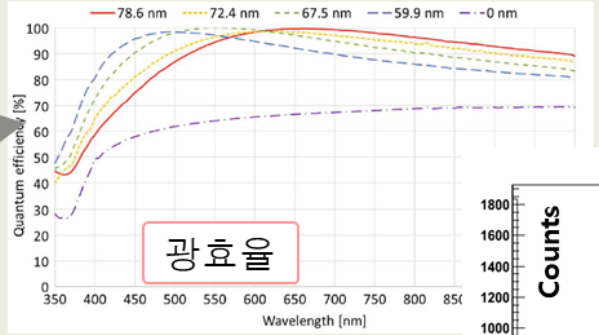


PCB 제작

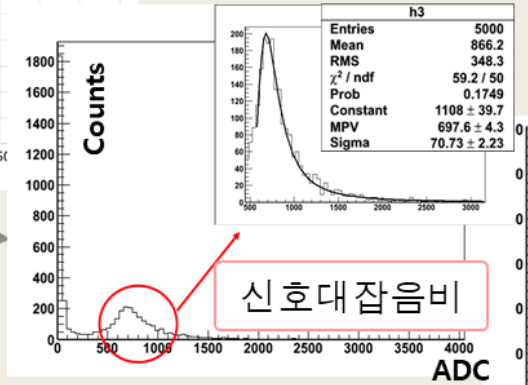
와이어 본딩

성능 검증

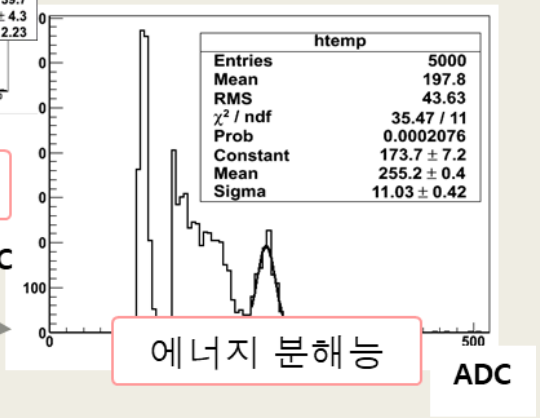
광효율 측정 @KRISS



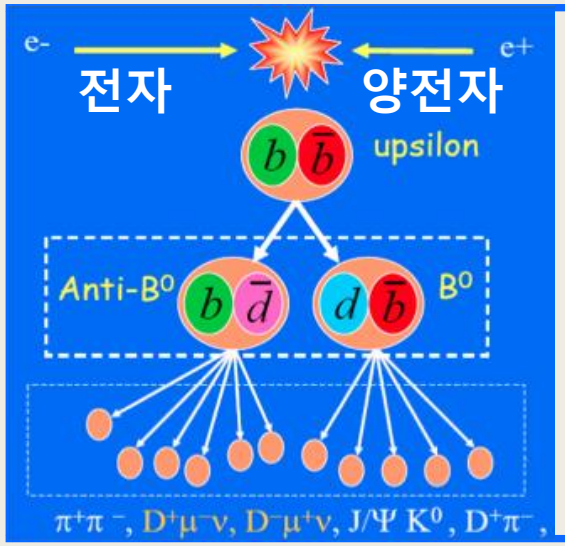
Sr-90 (beta) 방사선원 검출



CsI(Tl) 섬광체 사용하여
Cs-137 (gamma) 방사선원 검출



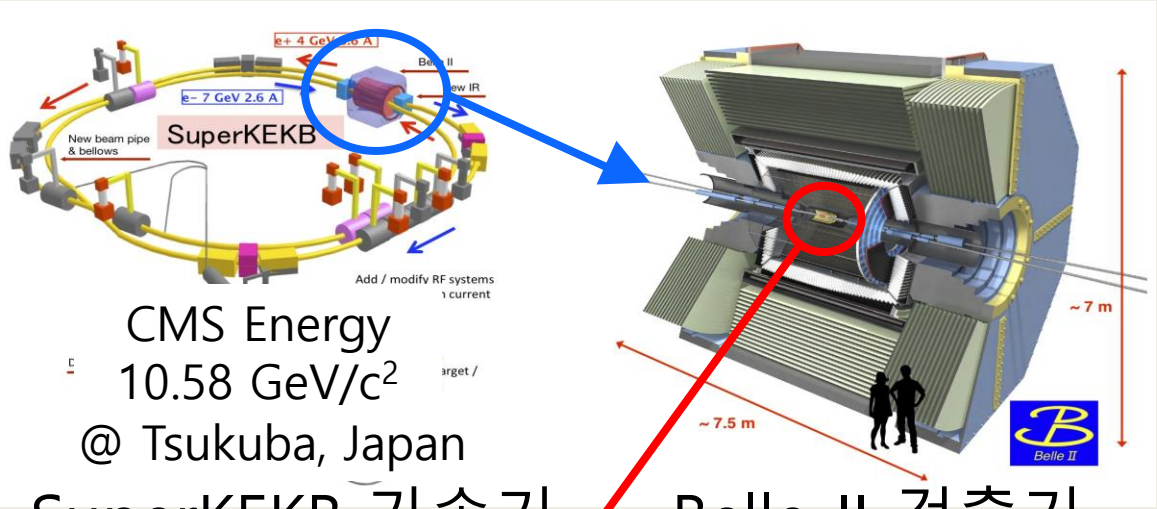
Belle/Belle-II 실험



전자-양전자 충돌

B 중간자 쌍 생성

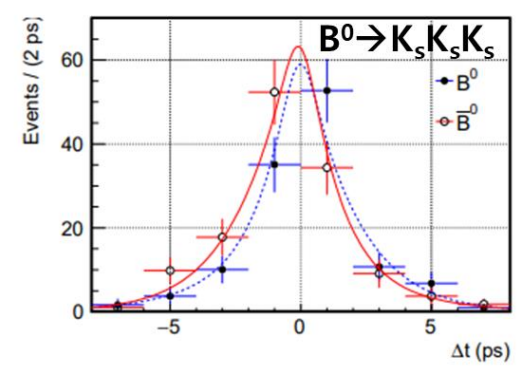
B 중간자 붕괴 관측

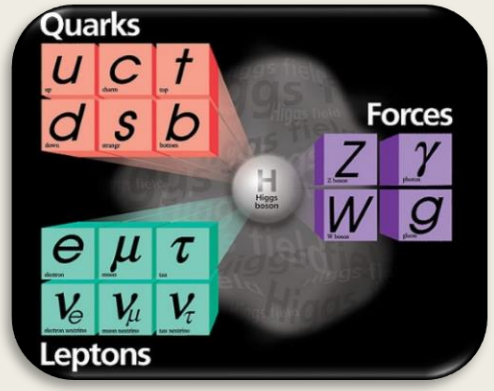


CMS Energy
10.58 GeV/c^2
@ Tsukuba, Japan

SuperKEKB 가속기

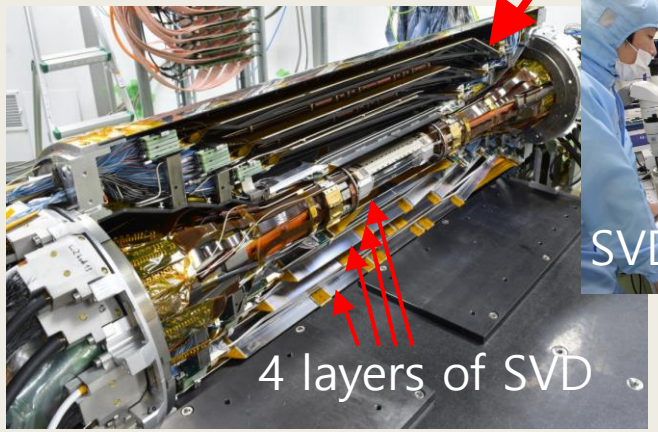
Belle-II 검출기

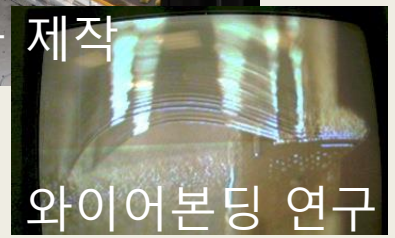




표준 모형 정밀 검증, 새로운 물리 현상 관측

획득한 데이터 분석





Silicon Vertex Detector 연구 및 제작

실리콘 반도체 검출기 연구실#108

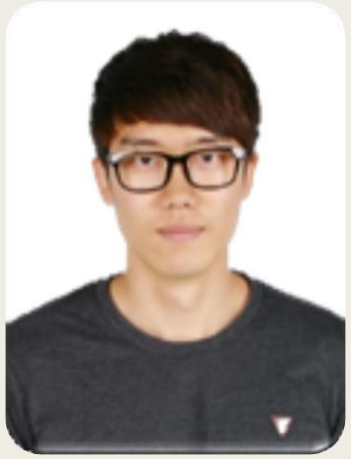
박환배 교수님

박사

강국현

박사 과정

전혜빈



이승철

석사 과정

김진용

백종민

현재 연구 내용

- Belle 실험 데이터를 이용한 $B^0 \rightarrow K_sK_sK_s$ 희귀 붕괴 모드 분석 (PRD submitted)
- Belle, Belle II 실험 데이터를 이용한 $B^0 \rightarrow K_sK_s\gamma$ 희귀 붕괴 모드 분석
- 의료용 이미징을 위한 JFET 스위치를 포함하는 픽셀 센서 개발
- 포항가속기연구소 방사광 빔 포지셔닝을 위한 광센서 개발