CARACTERIZACIÓN DETECTOR DE MICROBANDAS DE SILICIO

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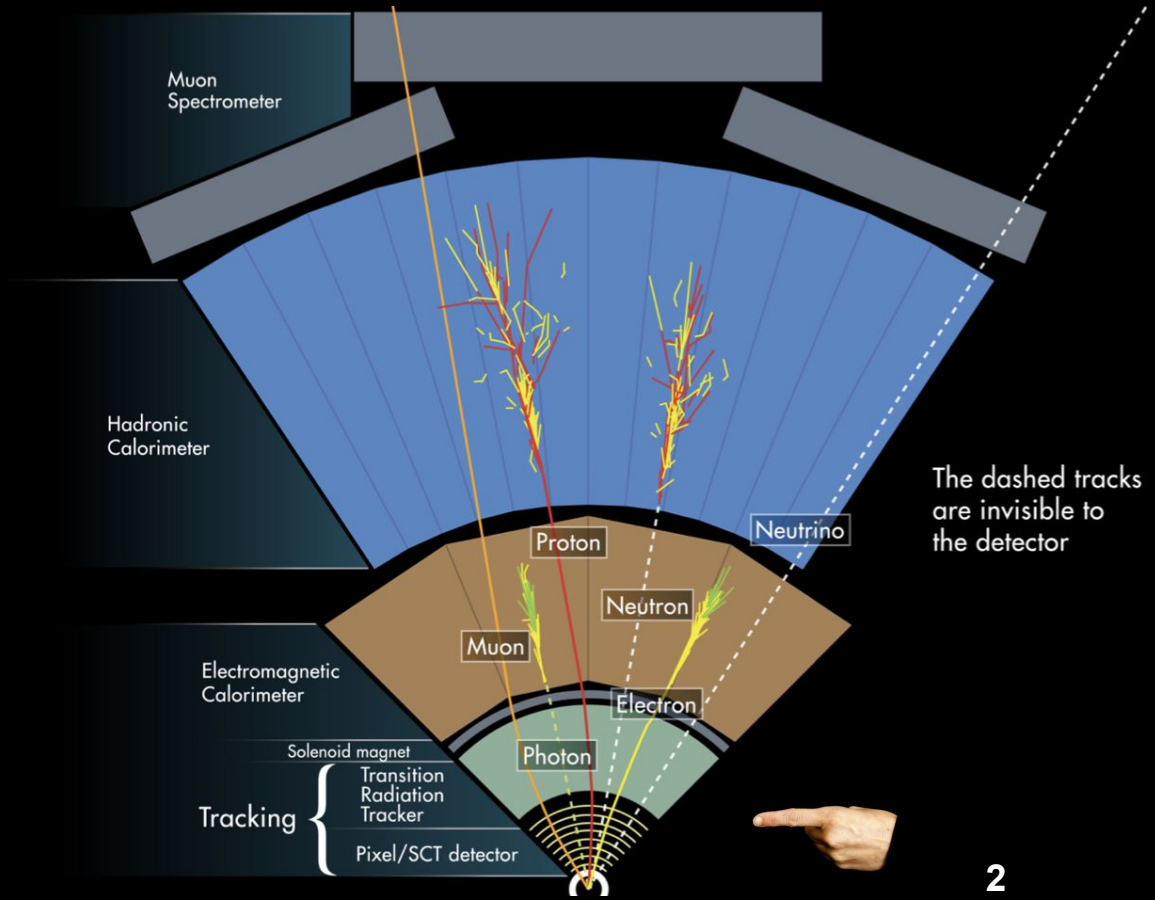
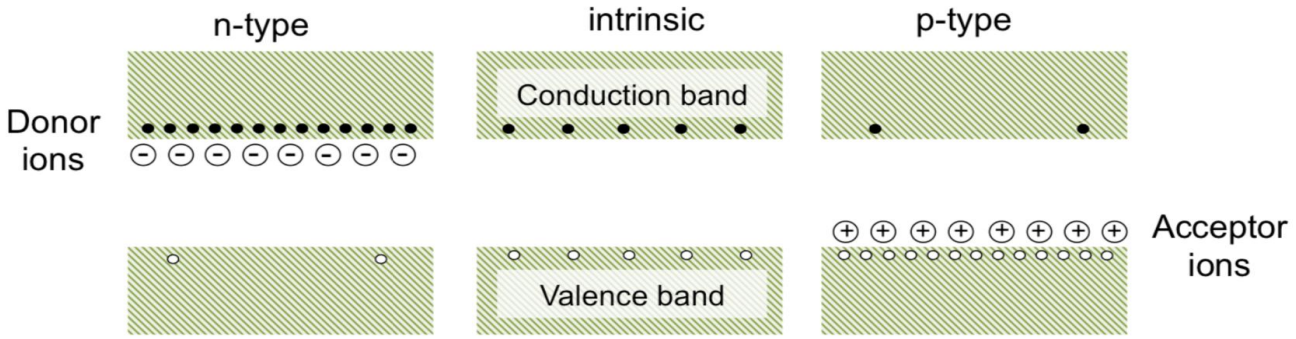
Muon System

Calorimetry

Tracking + Magnet

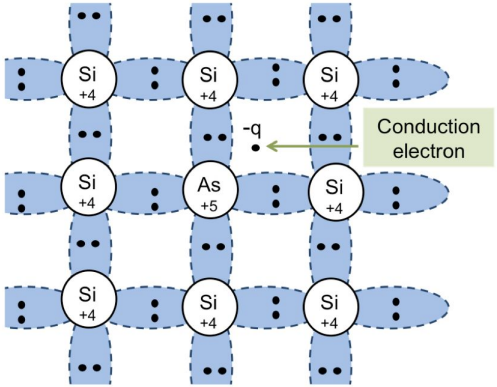


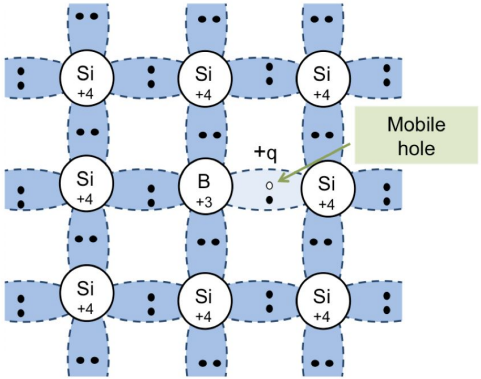
SEMICONDUCTORES EXTRÍNSECOS



TIPO N

Electrones libres





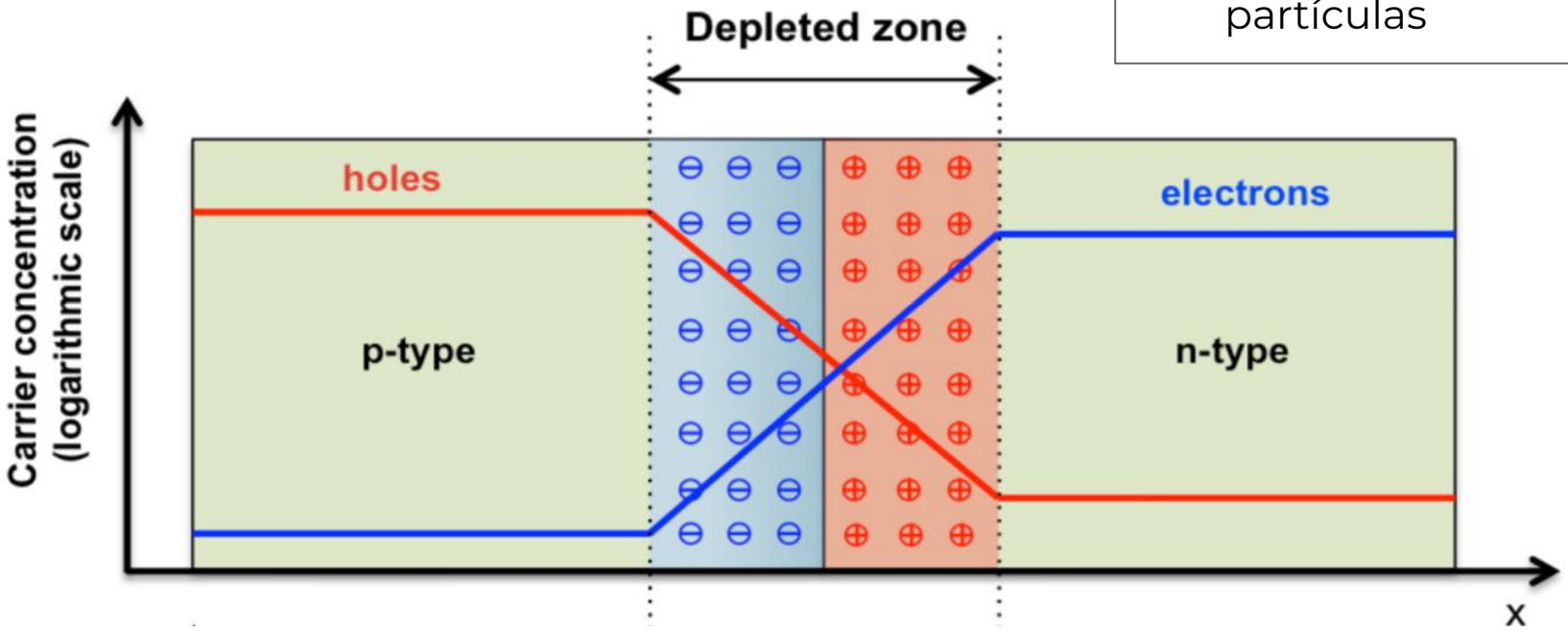
TIPO P

Se generan huecos

UNIÓN P-N

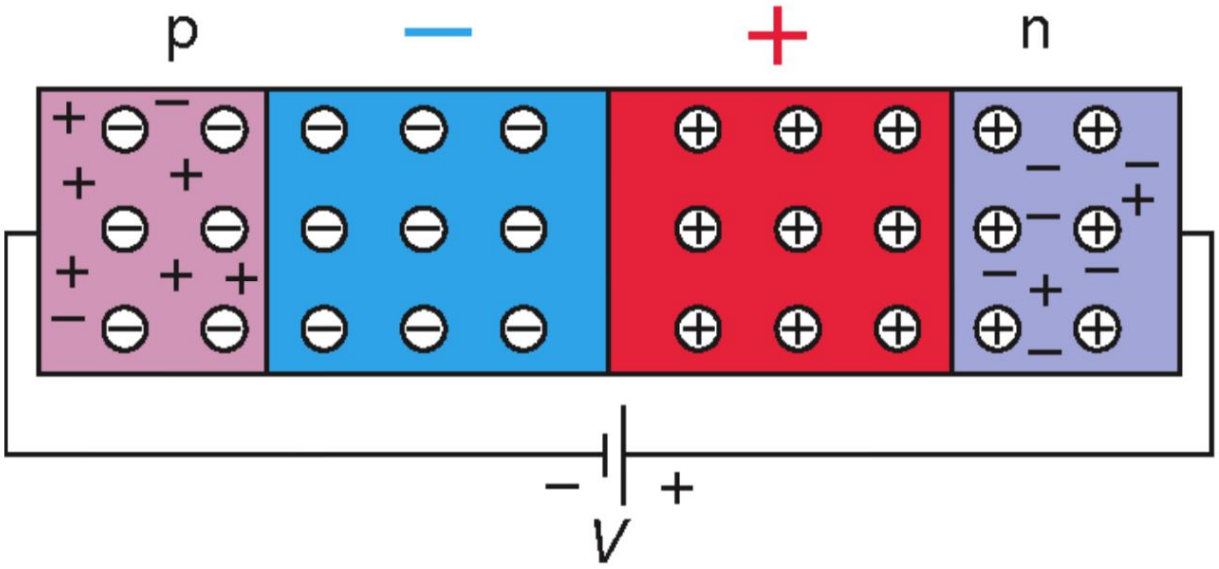
REGIÓN DESERTIZADA

- Sin cargas libres
- Sensible al paso de las partículas



UNIÓN P-N POLARIZADA EN REVERSO: DESERTIZACIÓN TOTAL

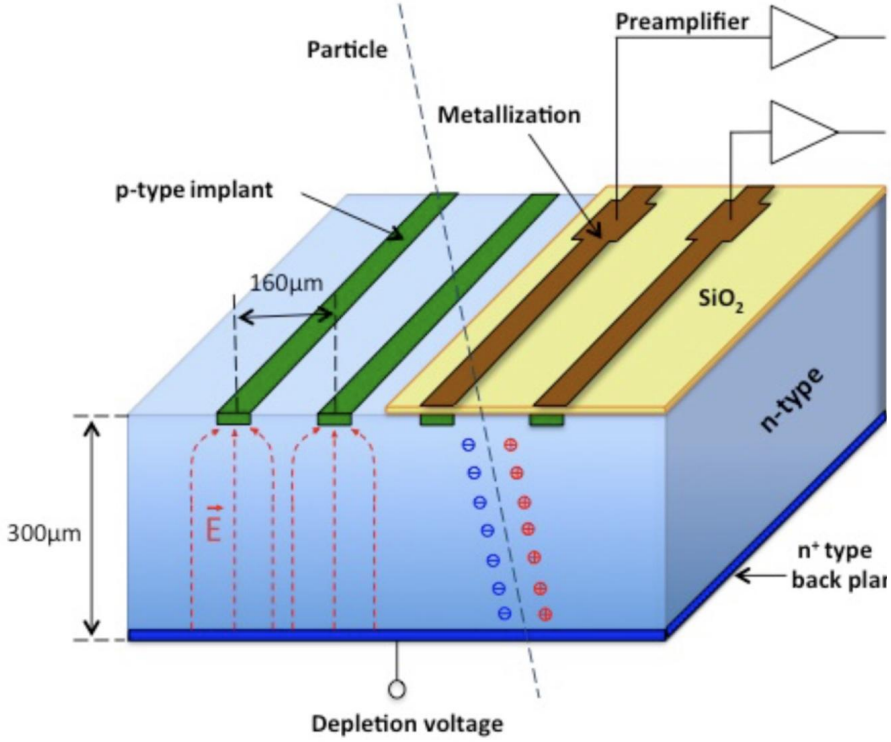
Añadiendo un voltaje externo puedo controlar y ampliar la región de desertización.



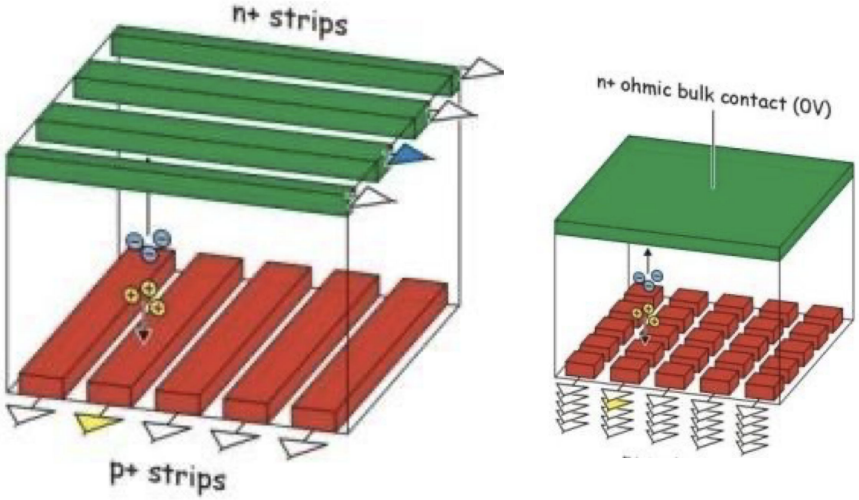
El detector más simple:

No me da información espacial

DETECTOR DE MICROBANDAS DE SILICIO



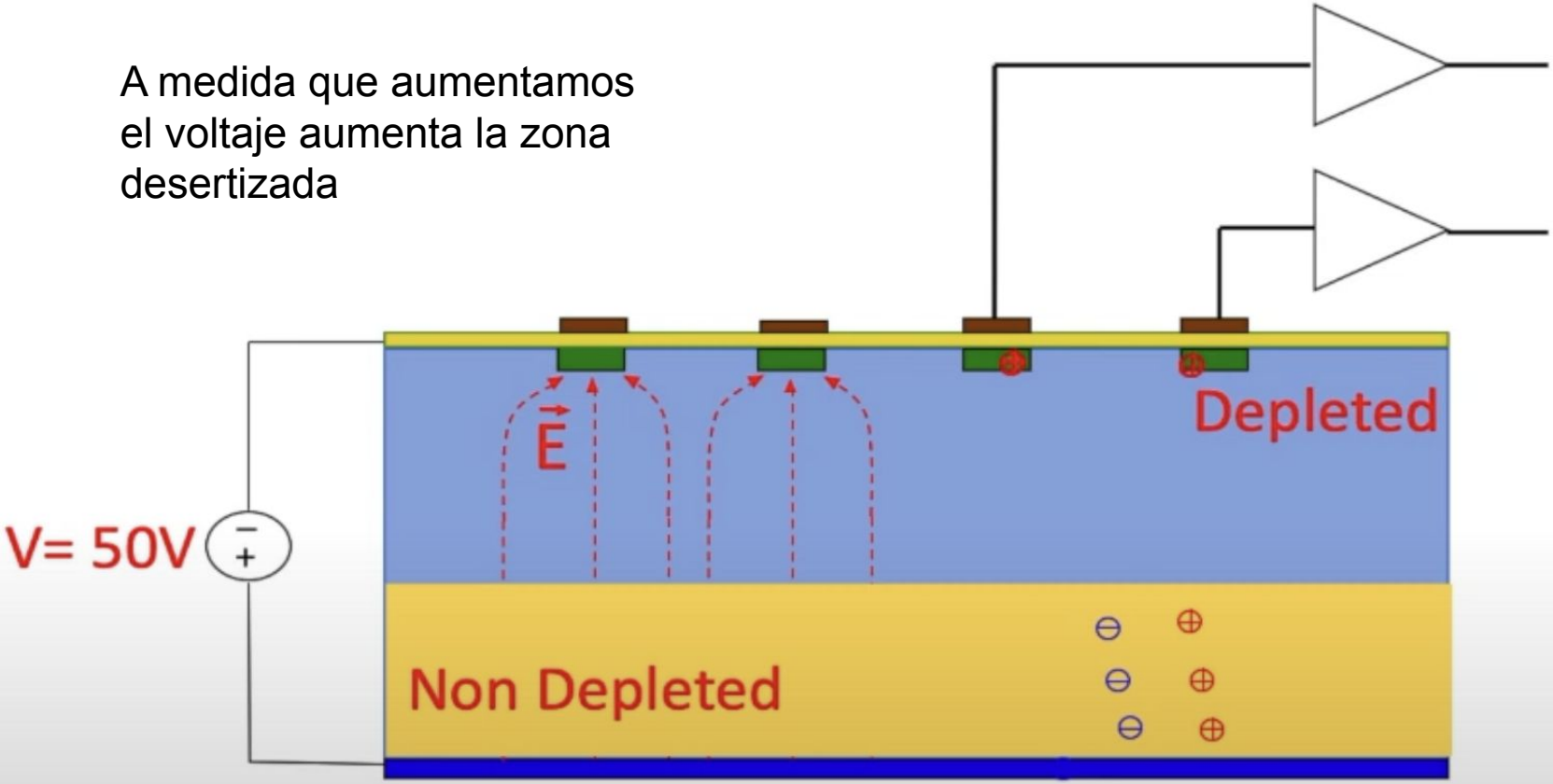
1D



2D

VOLTAJE DE DESERTIZACIÓN

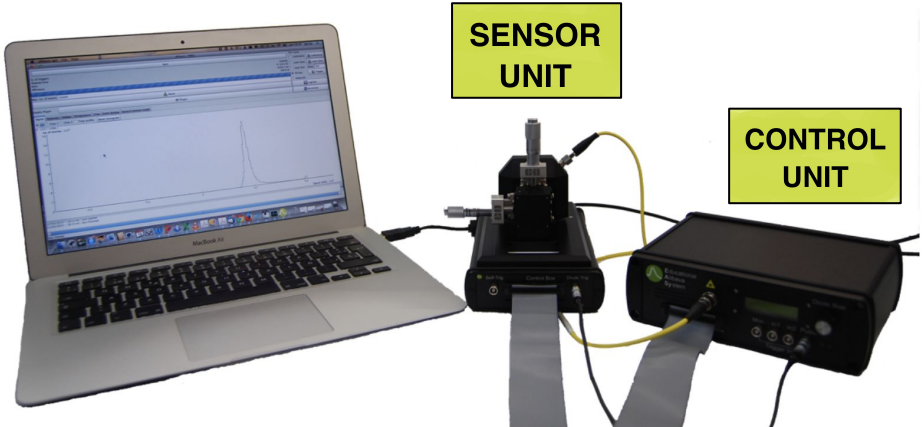
A medida que aumentamos el voltaje aumenta la zona desertizada

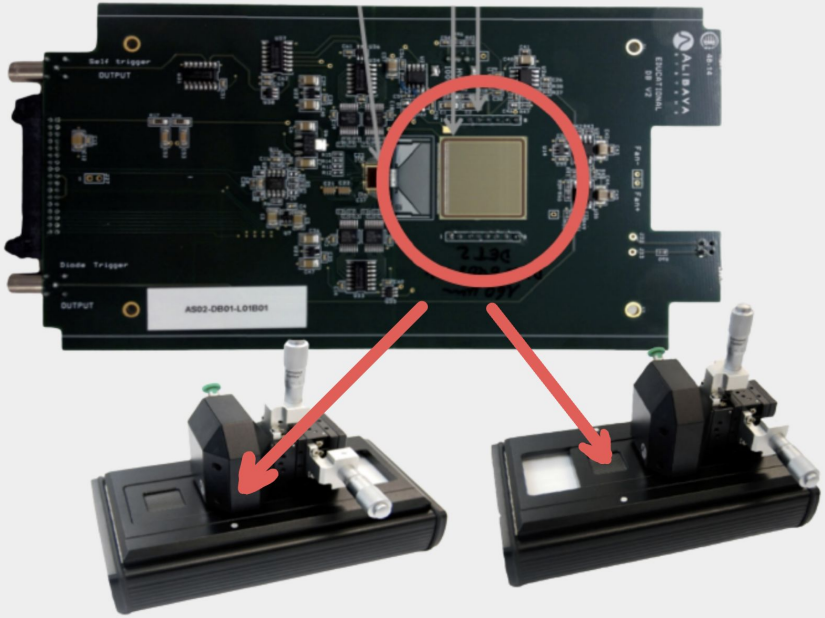


SET UP

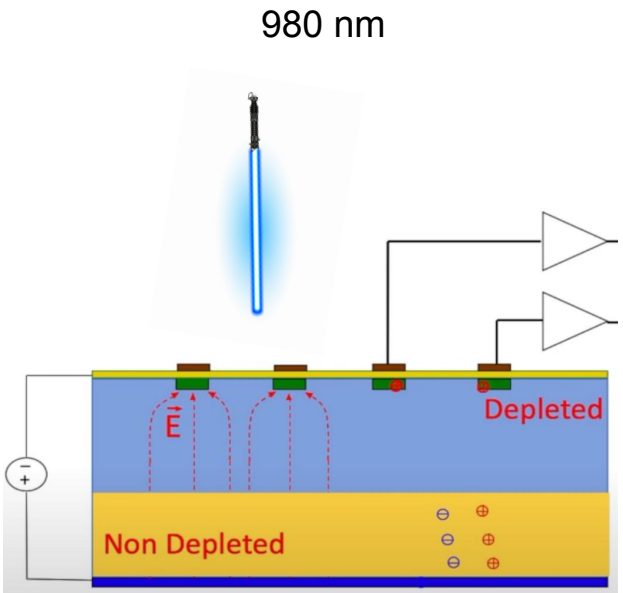
ALIBAVA SYSTEMS

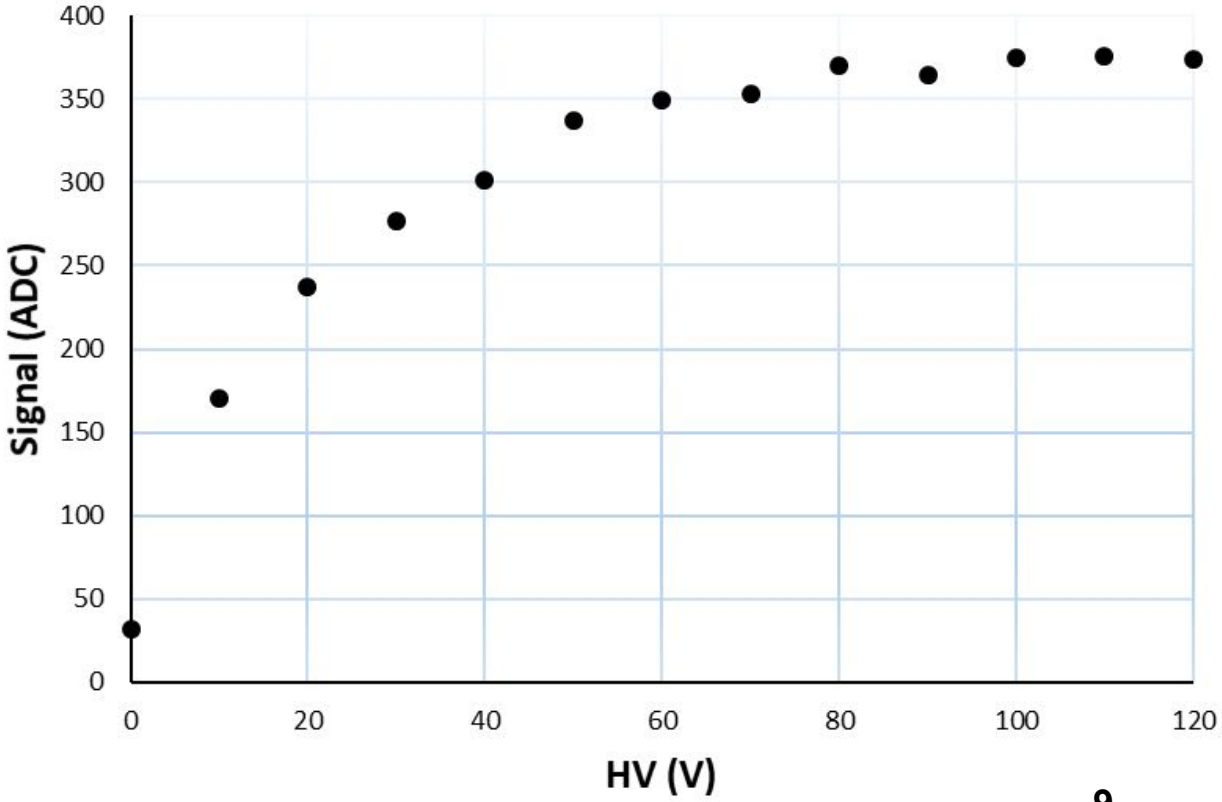
-> caracterización





¿Para qué voltaje obtenemos la desertización total?





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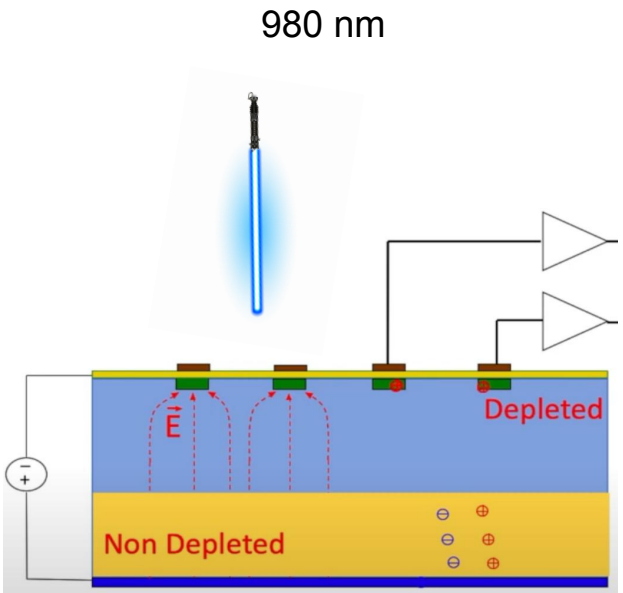
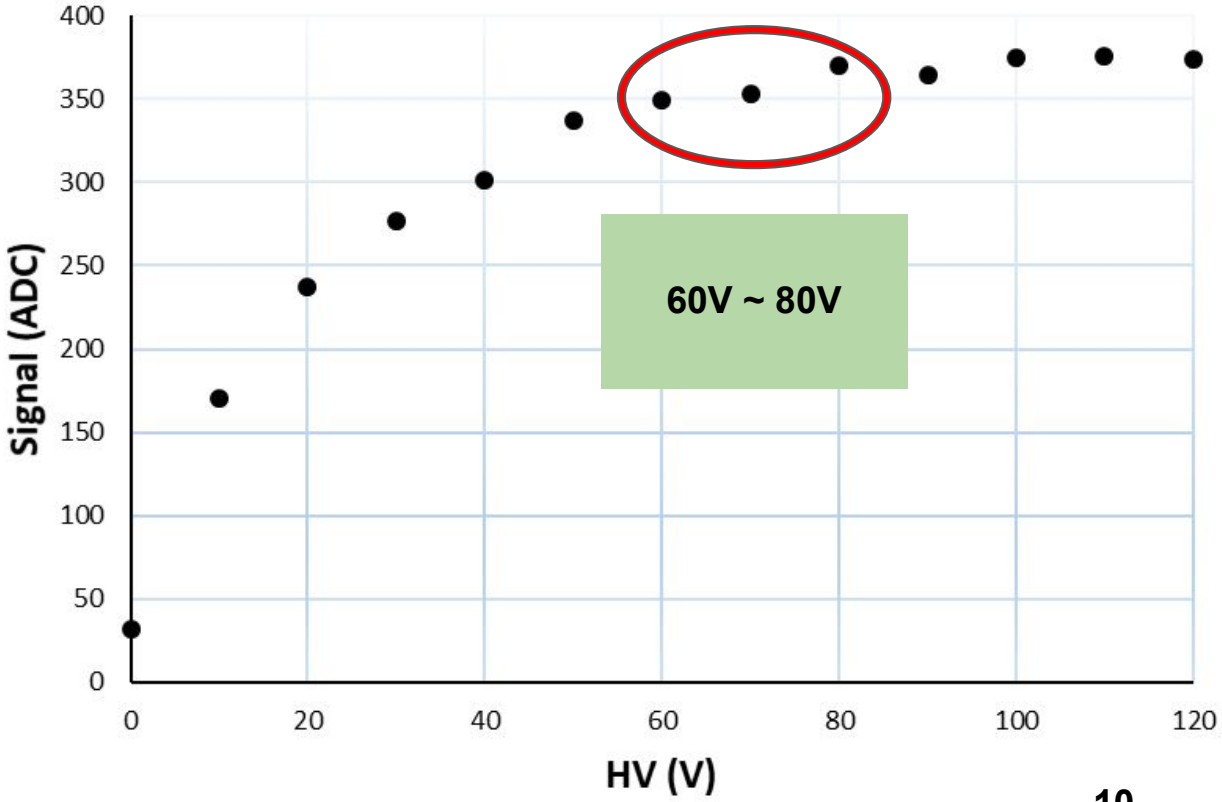
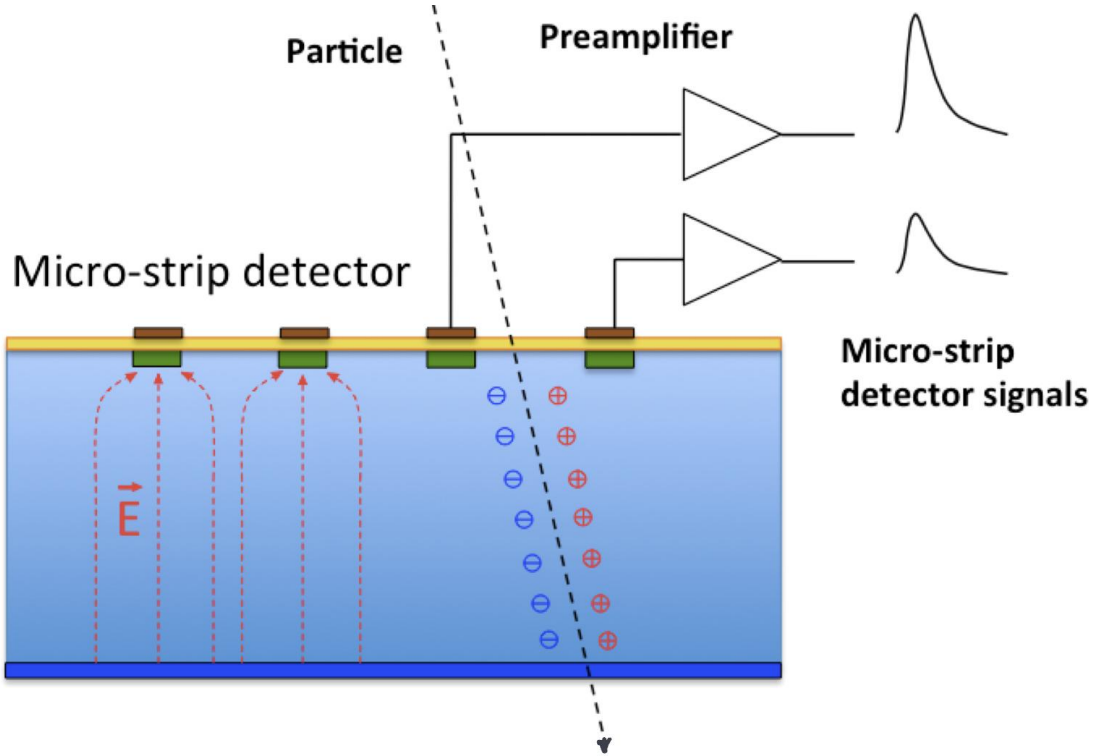
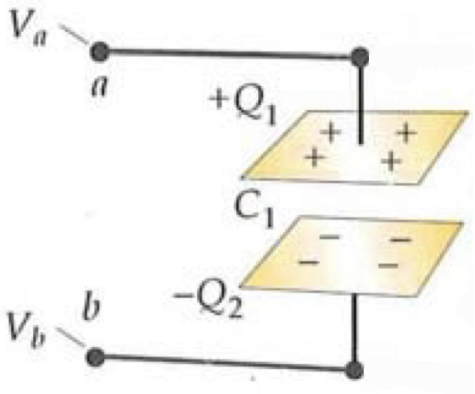




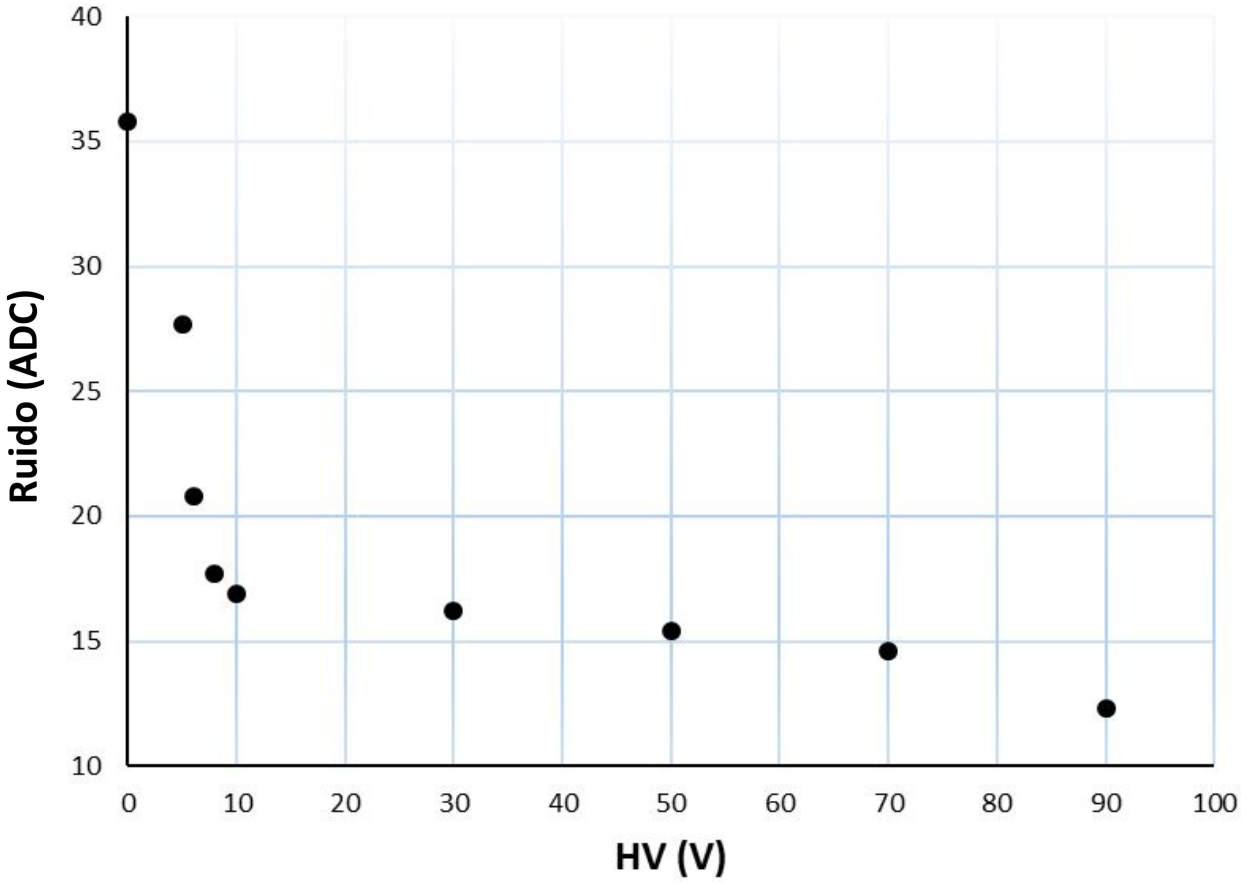

Particle
Preamplifier
Micro-strip detector
Micro-strip
detector signals
E

$$C = \frac{Q}{V}$$

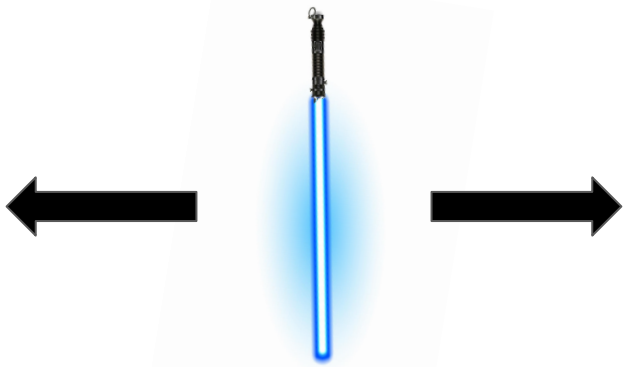

V_a
a
$+Q_1$
C_1
$-Q_2$
b
V_b

Evolución del ruido al aumentar el voltaje

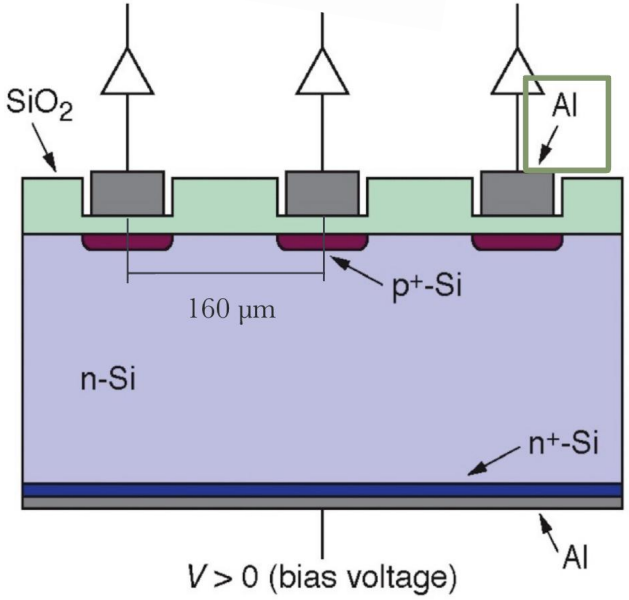
$$\mathrm{HV}\uparrow \Longrightarrow \mathrm{C}\downarrow \Longrightarrow \mathrm{Noise}\downarrow$$

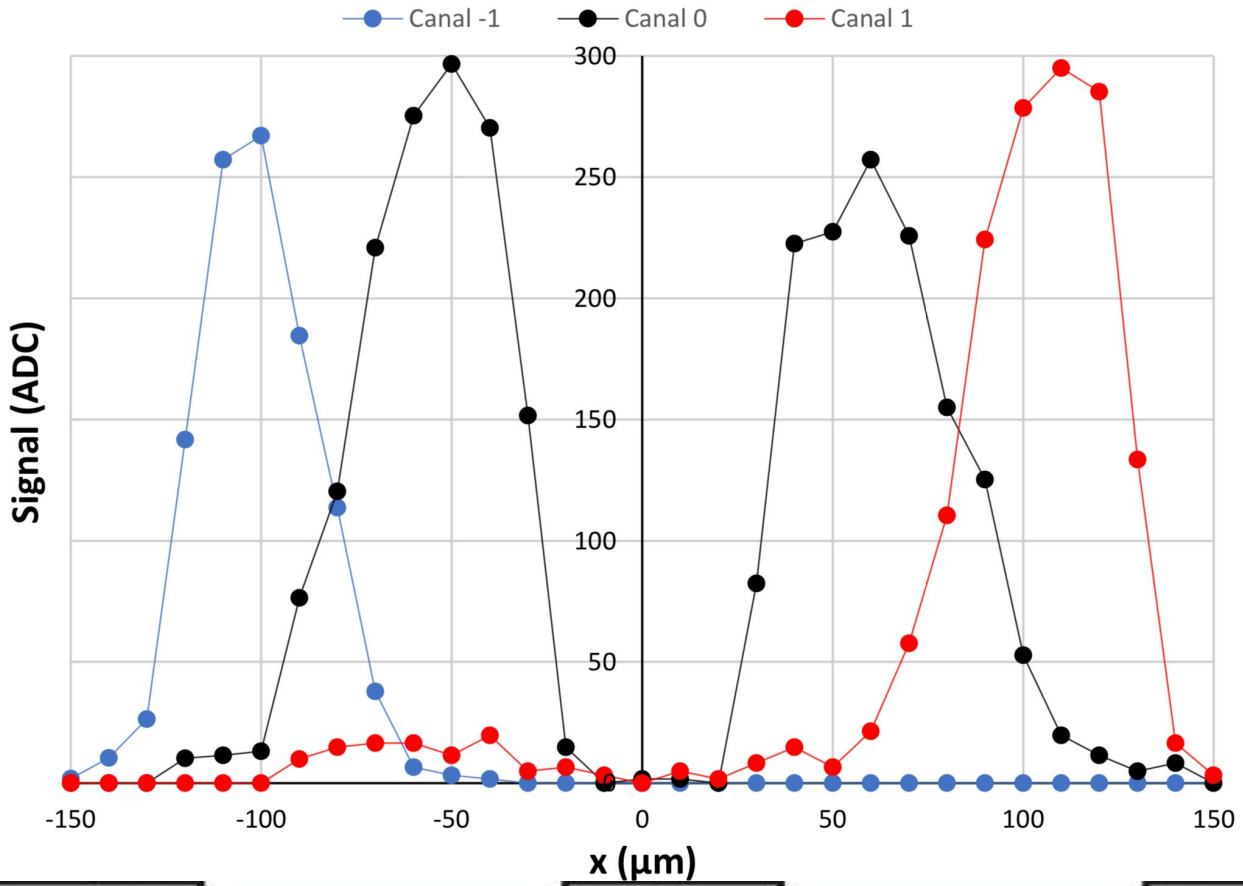


CARACTERIZACIÓN GEOMÉTRICA



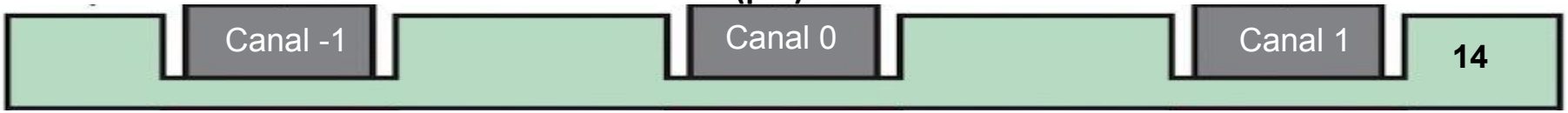
- Anchura implantes metálicos
- Distancia entre strips

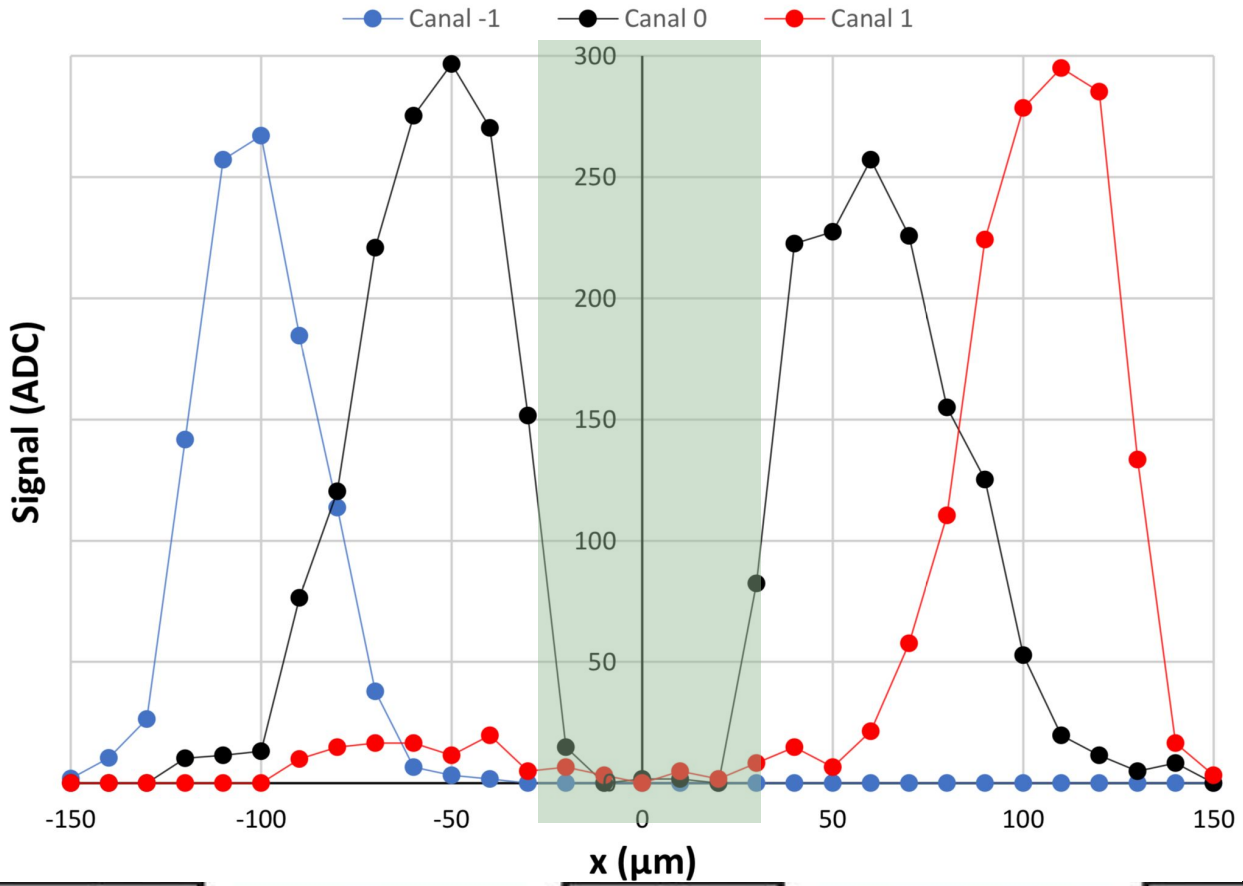




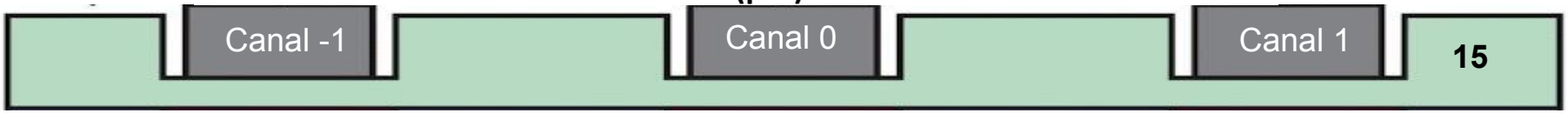
HV = 121V

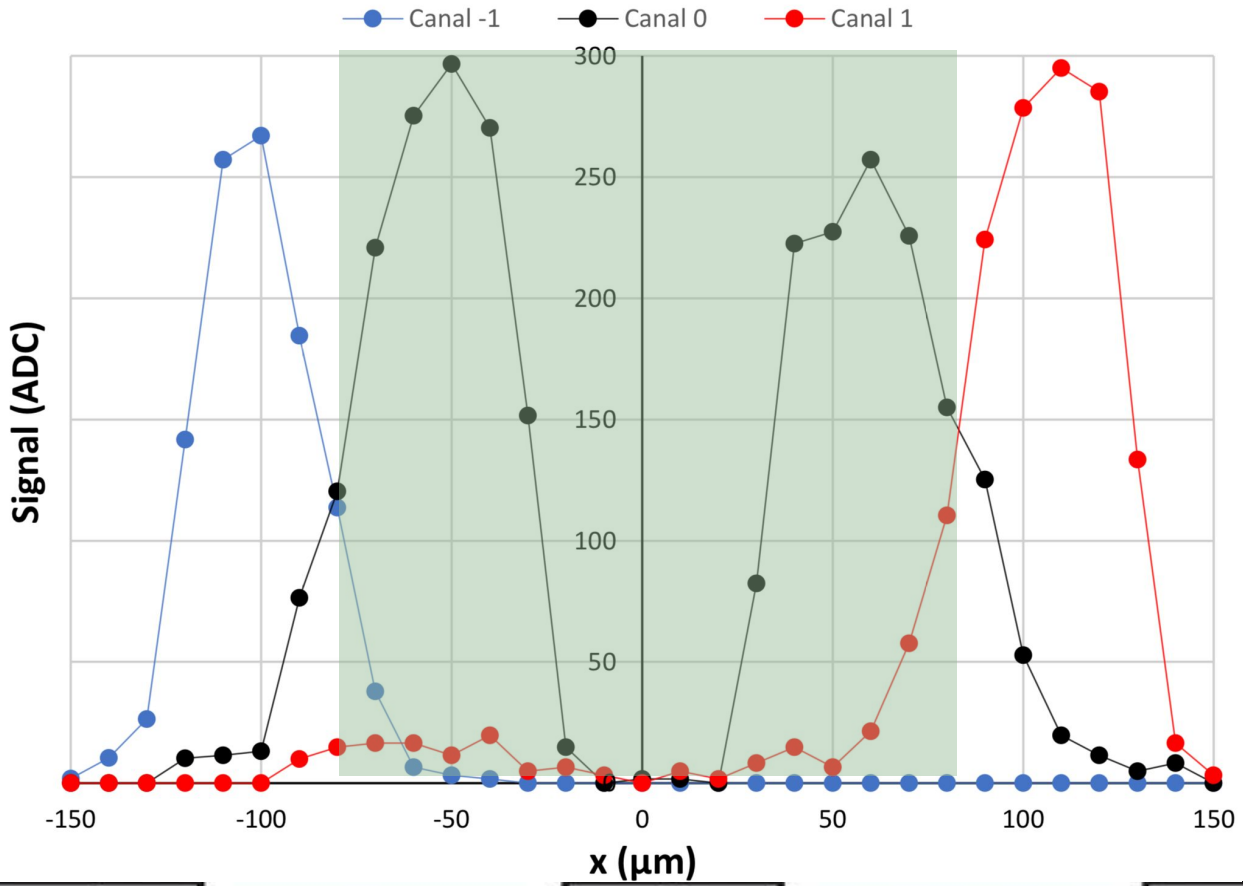
Anchura = 40 µm
Pitch = 160 µm



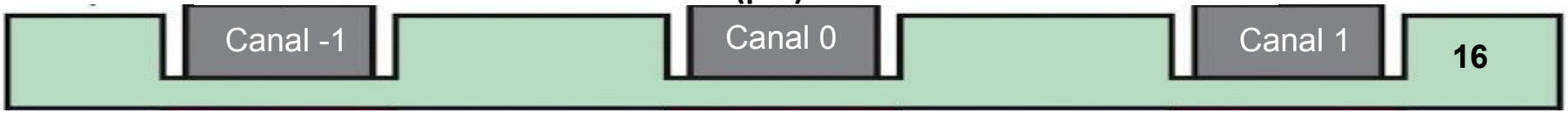


Anchura = 40 µm




Canal -1
Canal 0
Canal 1
Signal (ADC)
300
250
200
150
100
50
-150
-100
-50
0
50
100
150
x (µm)

Pitch = 160 µm


Canal -1
Canal 0
Canal 1

CONCLUSIONES

- Para detectar la dirección de las partículas se utilizan detectores de microbandas de silicio
- Hemos caracterizado uno de ellos obteniendo:
  - el voltaje de desertización de dos maneras posibles
  - la geometría interna

FIN