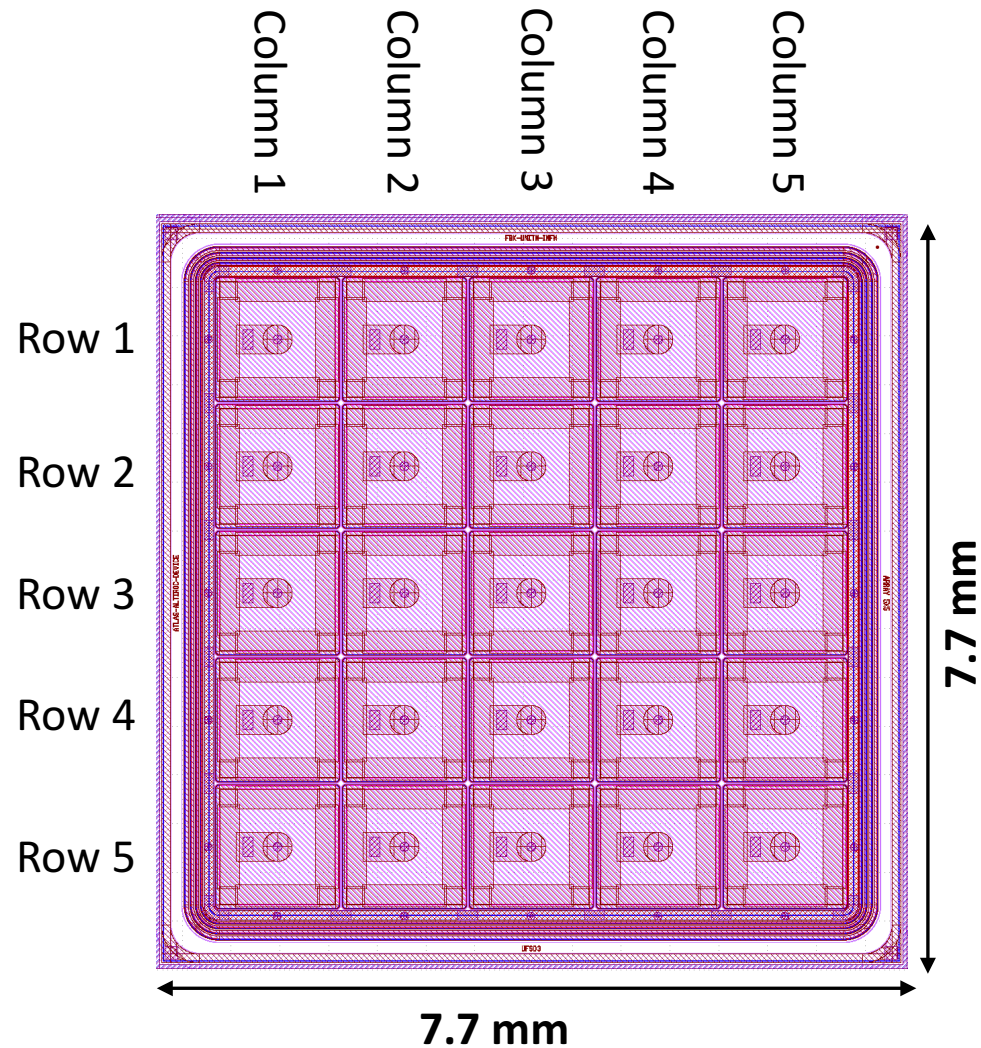


# CV on UFSD3 W1 ALTIROC sensors for JSI Triga Reactor studies - NEW

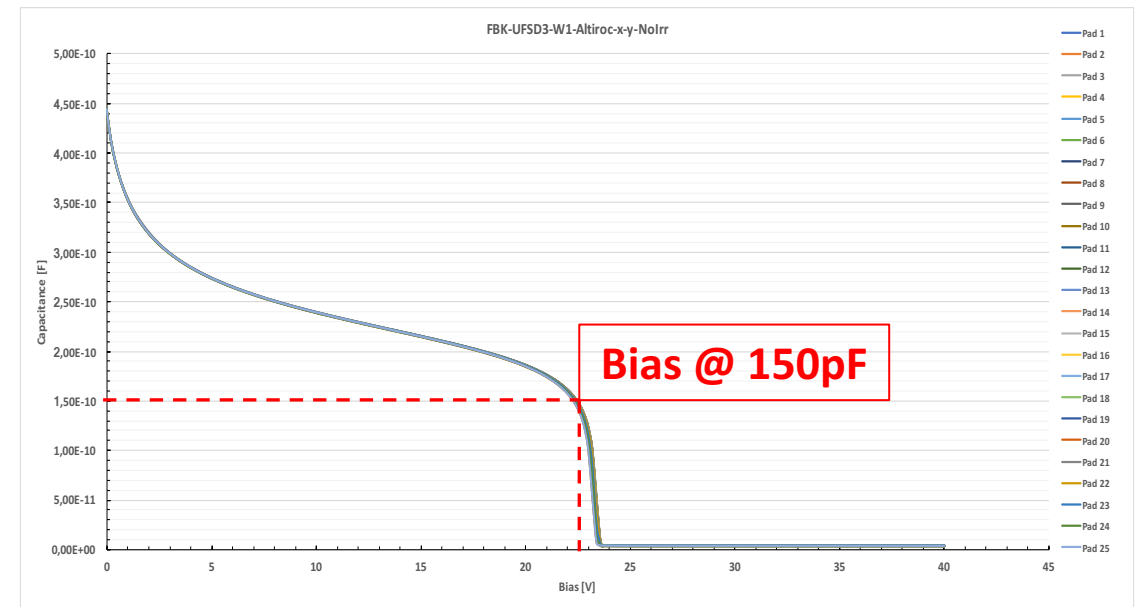
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V. Sola on behalf of the Torino group

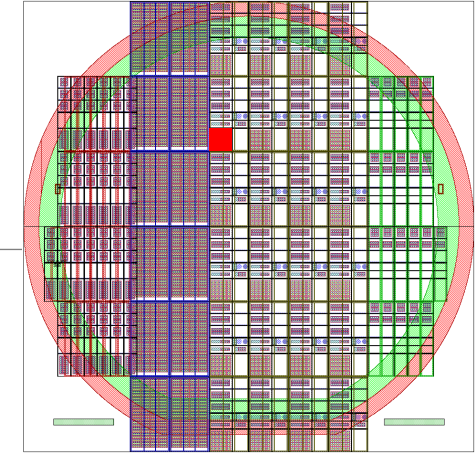
# ALTIROC Sensor



- **Wafer tested: W1 FBK-UFSD3**
- **Fluence: NEW**

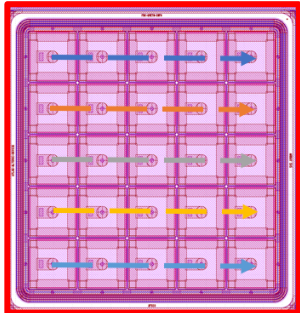


# CV on W1 13-5 - NEW

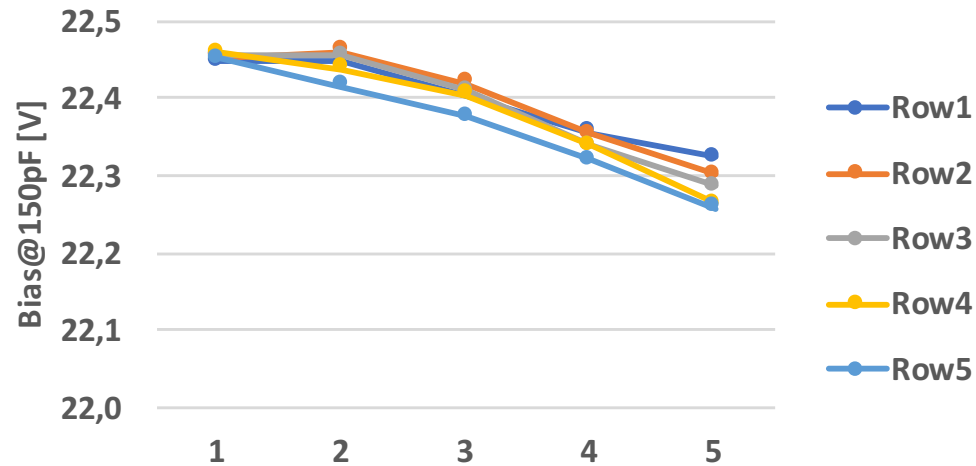


## Horizontal uniformity

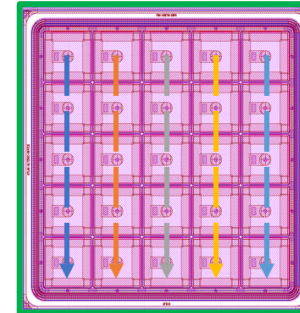
Average: 22,383 V  
RMS: 0,068 V



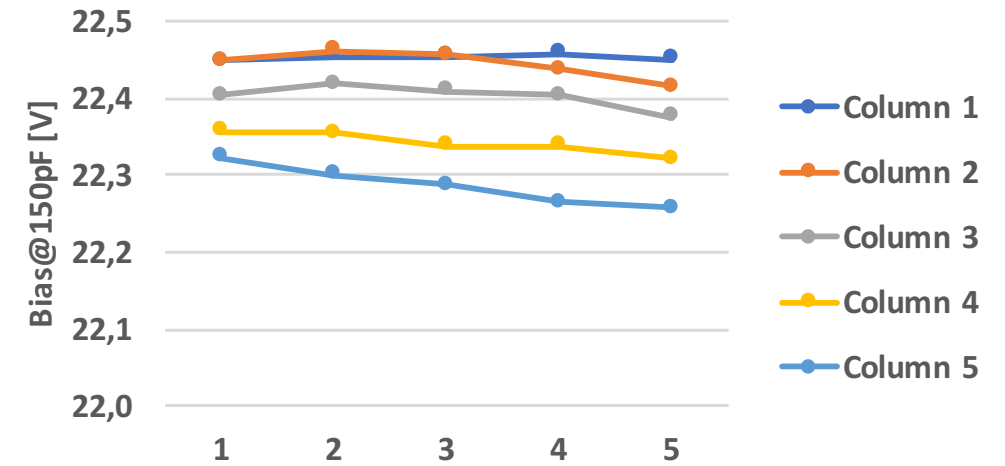
FBK-UFSD3-W1-Altiroc-13-5-New  
Bias@150pF trend from left to right



## Vertical uniformity



FBK-UFSD3-W1-Altiroc-13-5-New  
Bias@150pF trend from up to down



Container gets into the core through a tube and it is in vertical position during irradiation, parallel with fuel rods. Our samples are irradiated in channel F19.

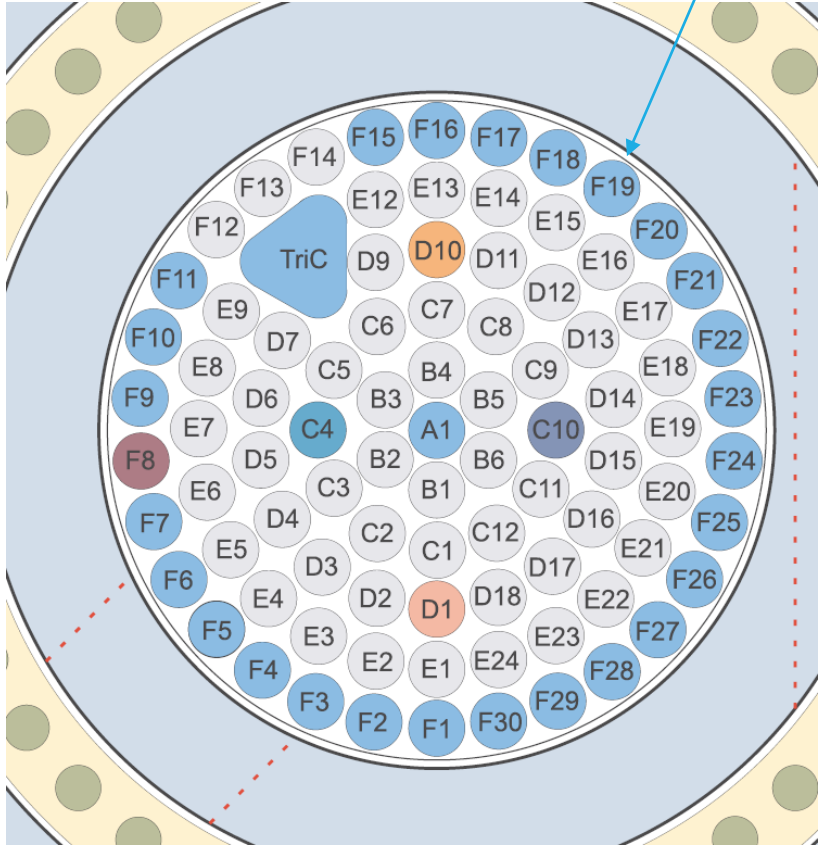
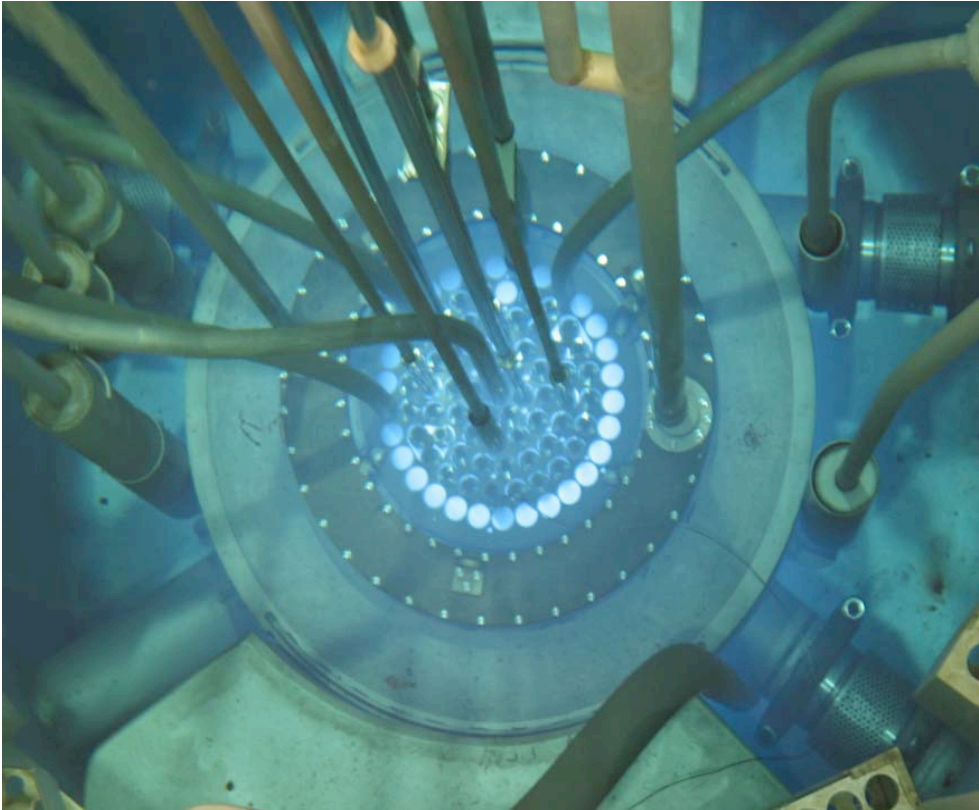
Rotation of the irradiation container around the axis of the cylinder is not controlled

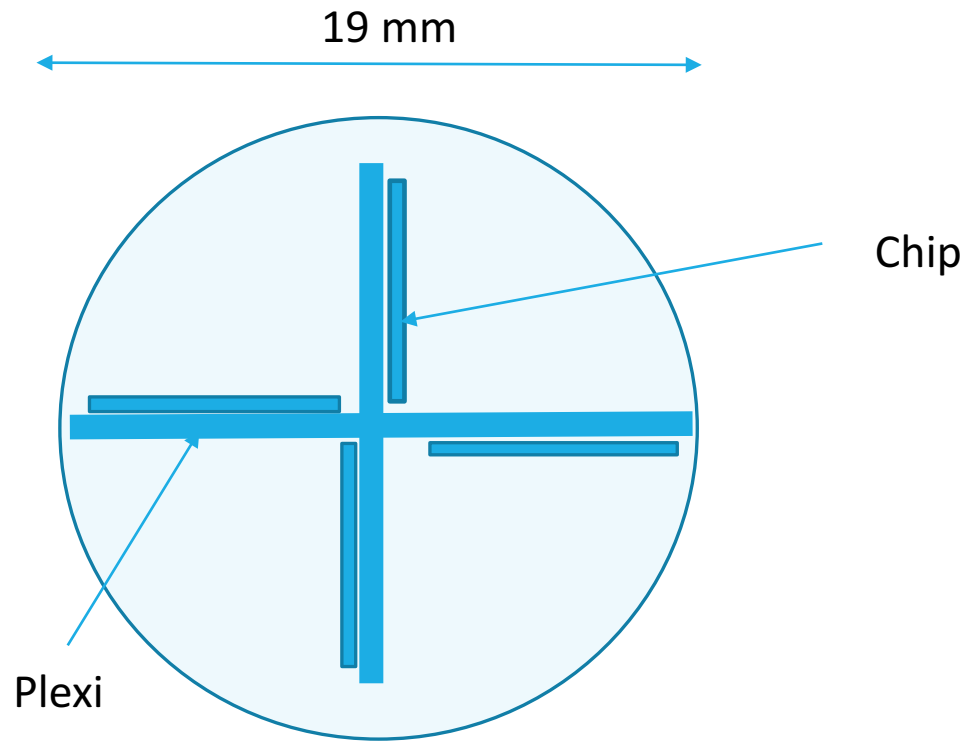
- we don't know the angle during irradiation.

More detail of the reactor in e.g.: L. Snoj et al., Applied Radiation and Isotopes 70 (2012) 483–488

Location of irradiation channel

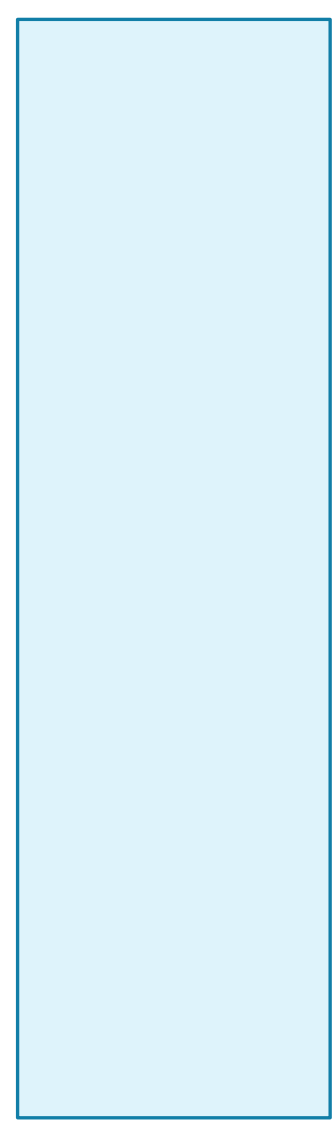
Photo of reactor core when reactor is on power (photo taken through 5 m of water from the platform)





Irradiation container, top view

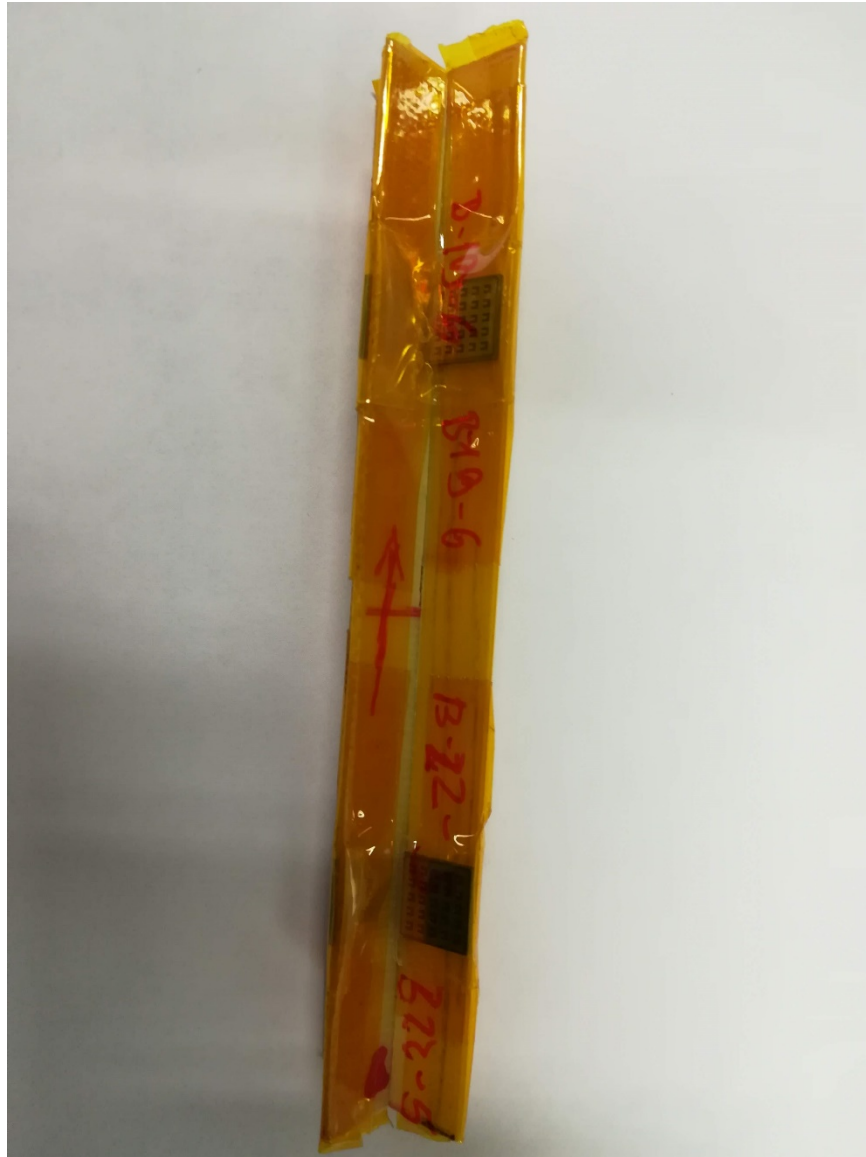
Container is in vertical position during irradiation, parallel  
With fuel rods. The channel is on the

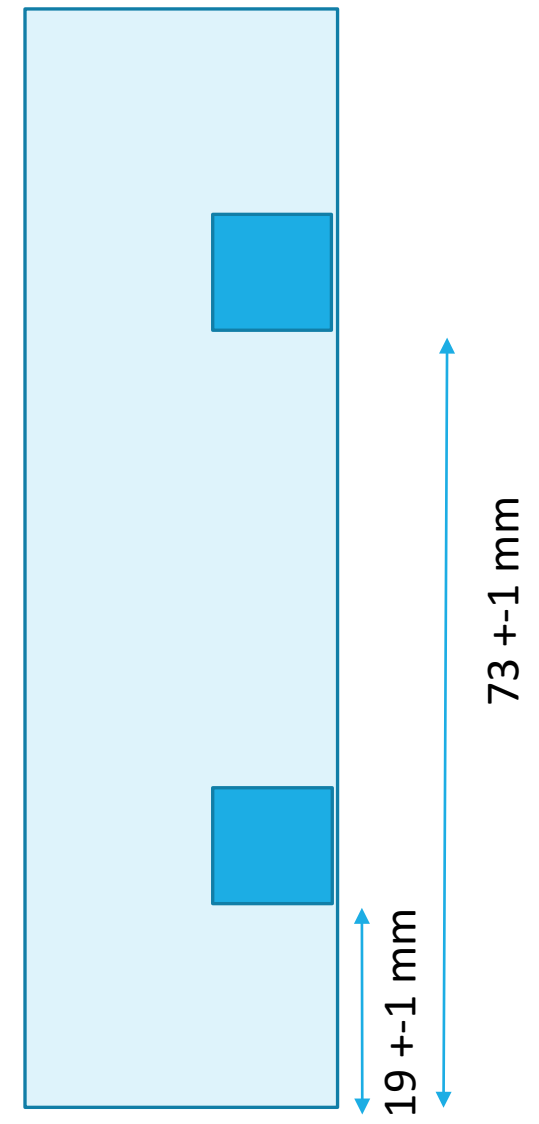
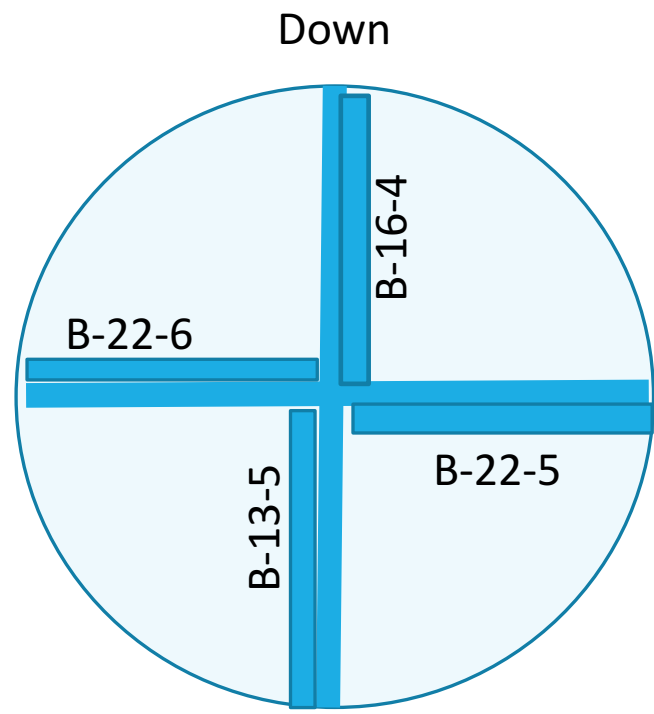
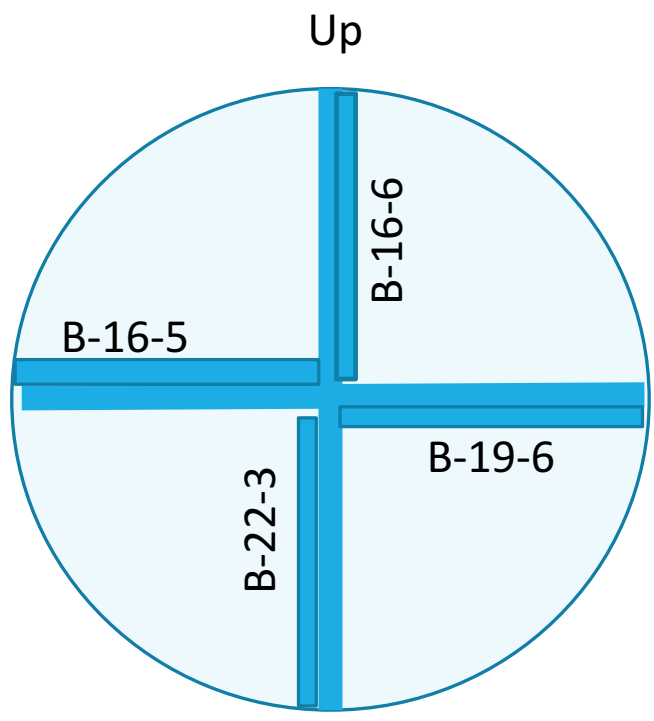


Side view  
10 cm

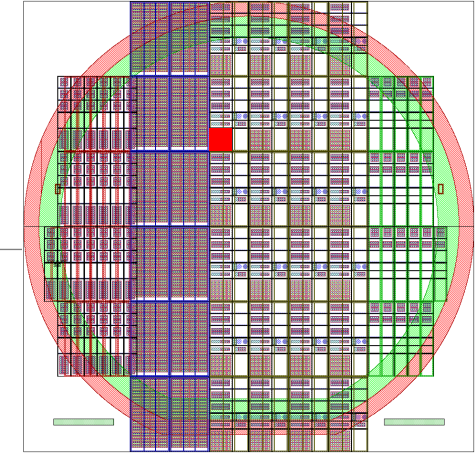
Samples ready for irradiation

From Igor

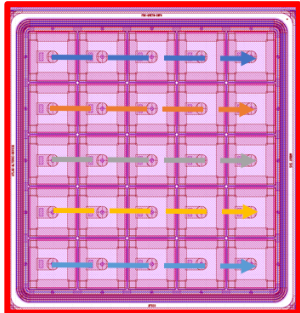




# CV on W1 13-5 - IRR

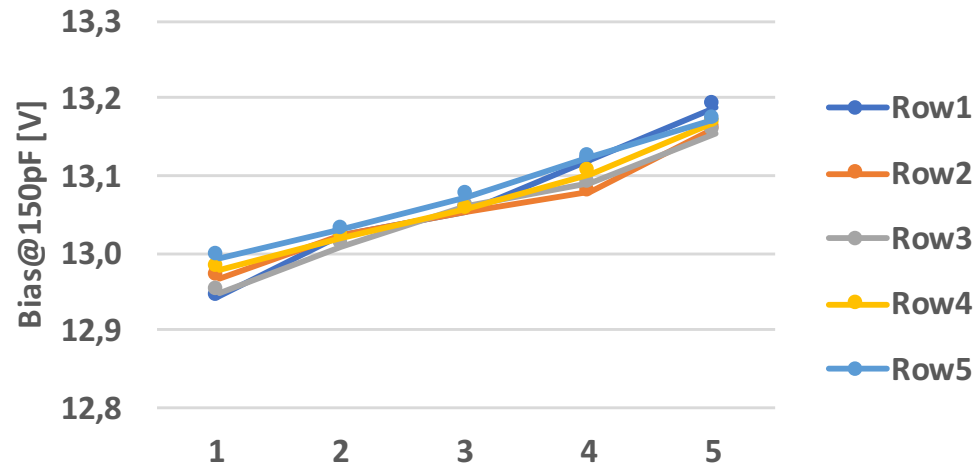


## Horizontal uniformity

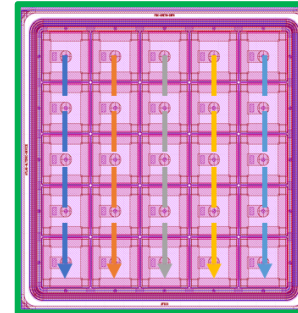


Average: 13,064 V  
RMS: 0,071 V

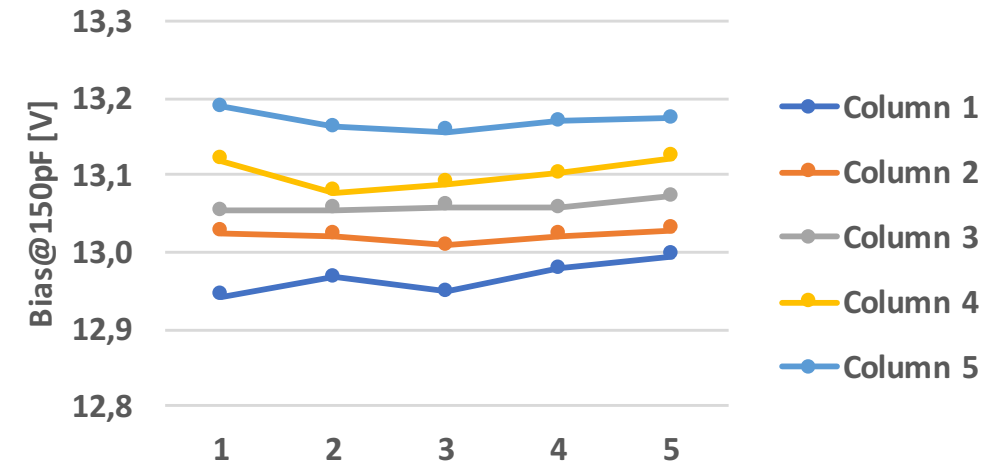
FBK-UFSD3-W1-Altiroc-13-5-Irr  
Bias@150pF trend from left to right



## Vertical uniformity

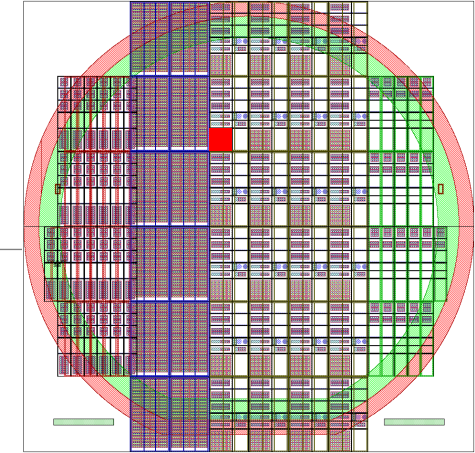


FBK-UFSD3-W1-Altiroc-13-5-Irr  
Bias@150pF trend from up to down

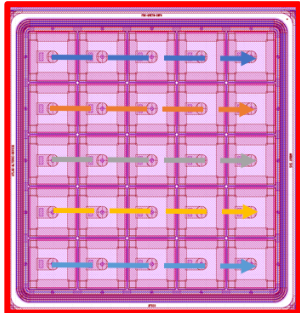




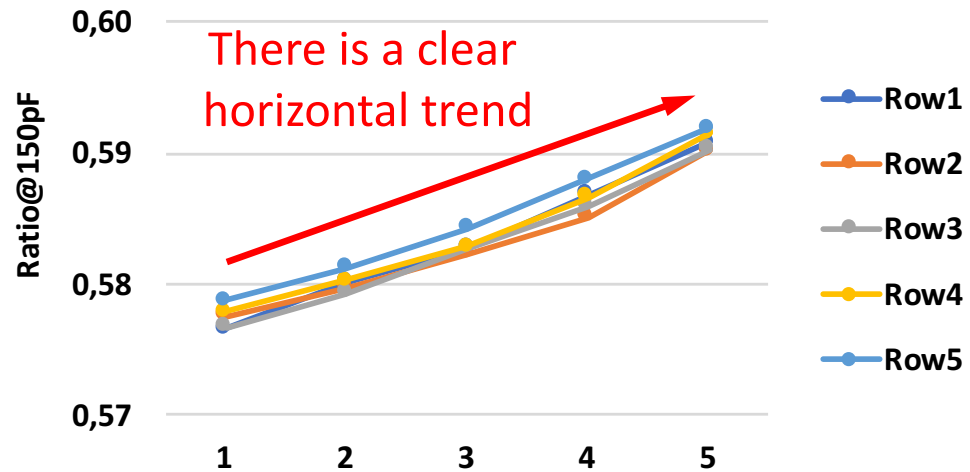
# CV on W1 13-5 - RATIO



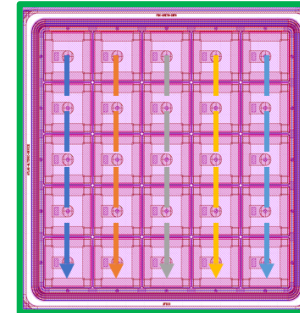
## Horizontal uniformity



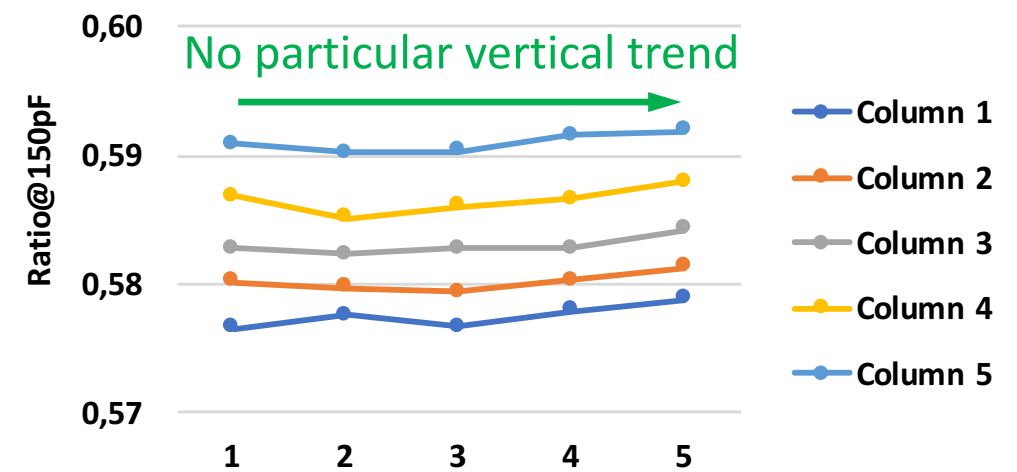
FBK-UFSD3-W1-Altiroc-13-5  
Trend from left to right



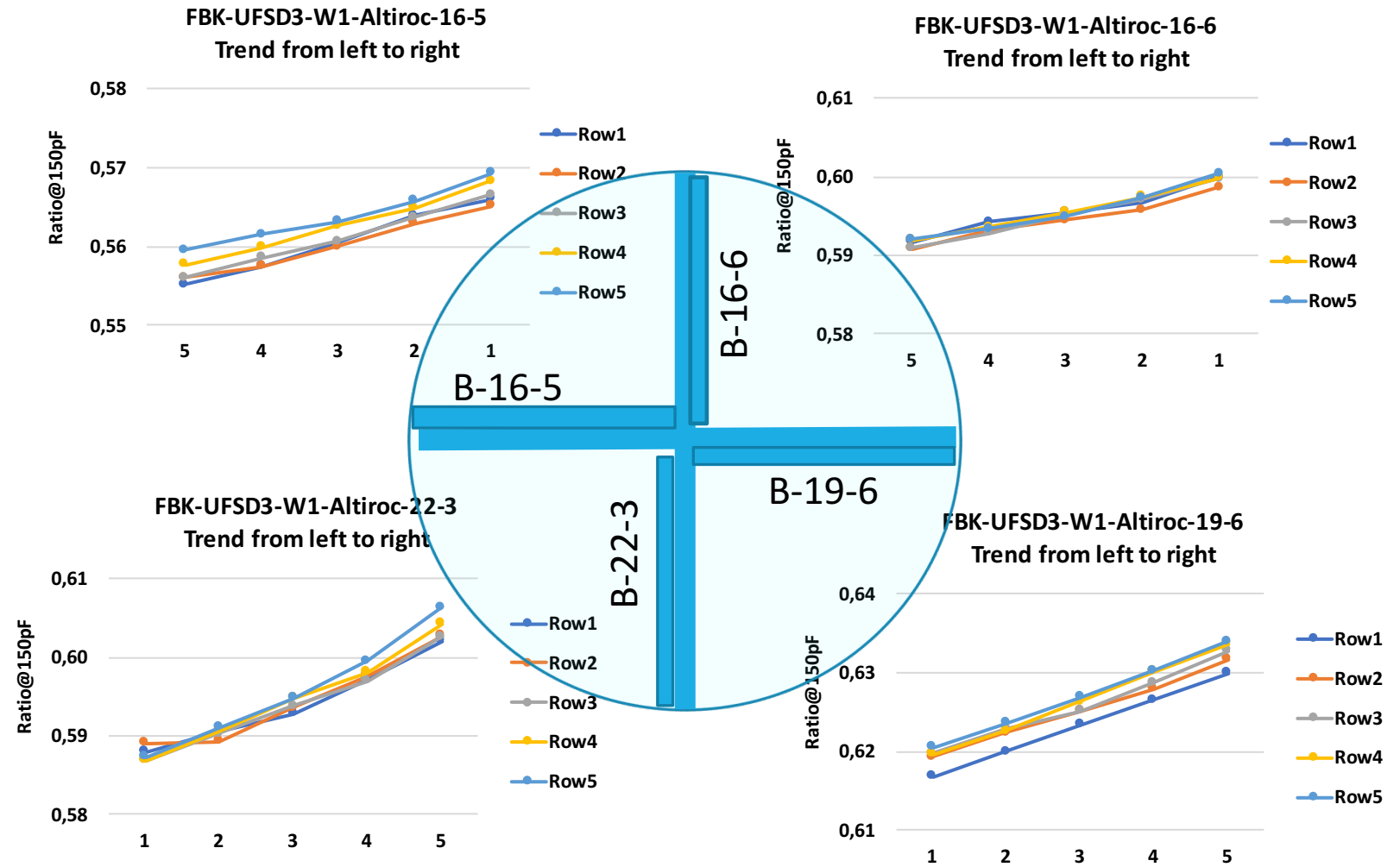
## Vertical uniformity



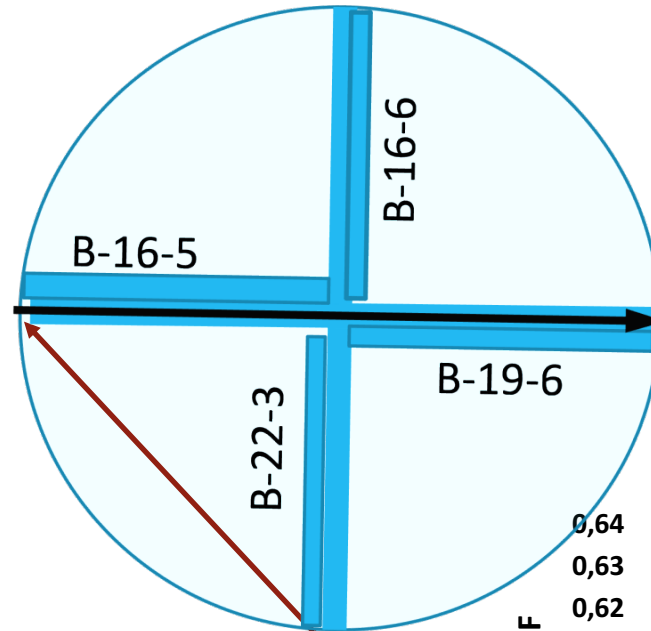
FBK-UFSD3-W1-Altiroc-13-5  
Trend from up to down



# Horizontal Trend - UP

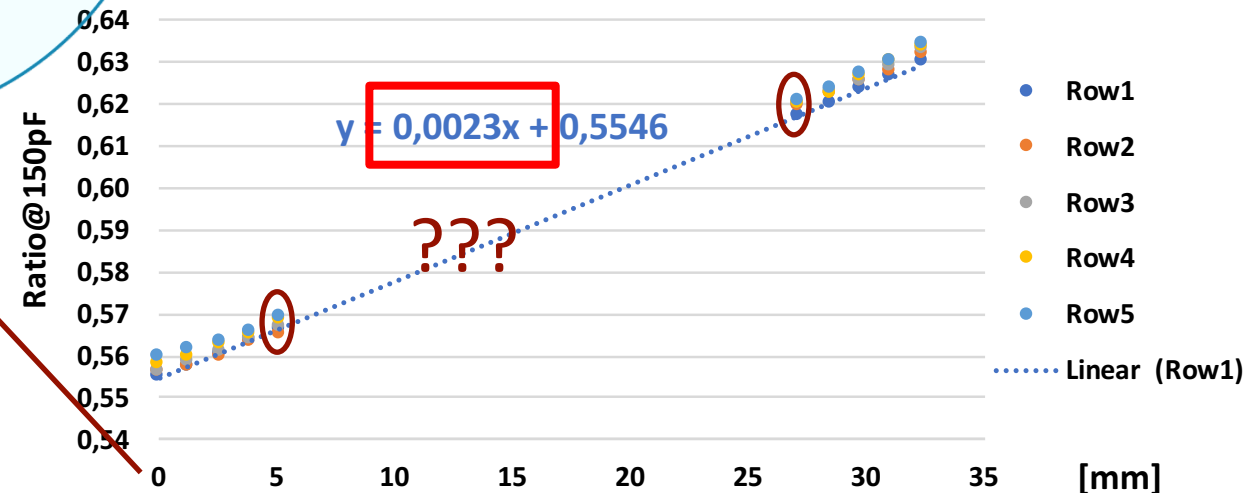


# Horizontal Trend - UP

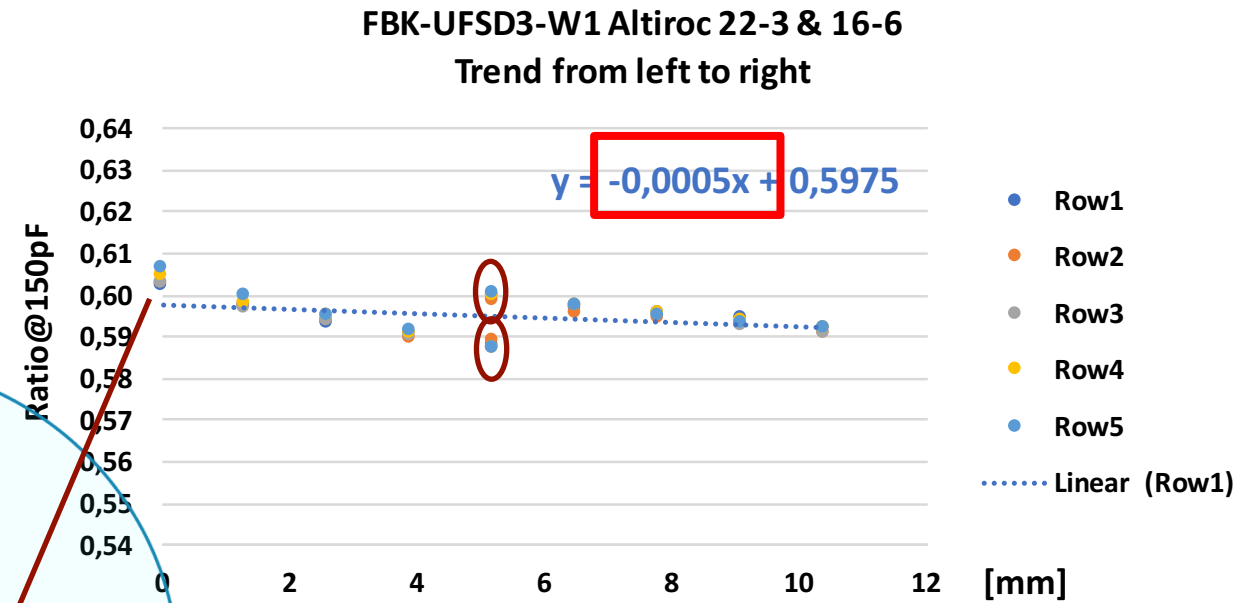
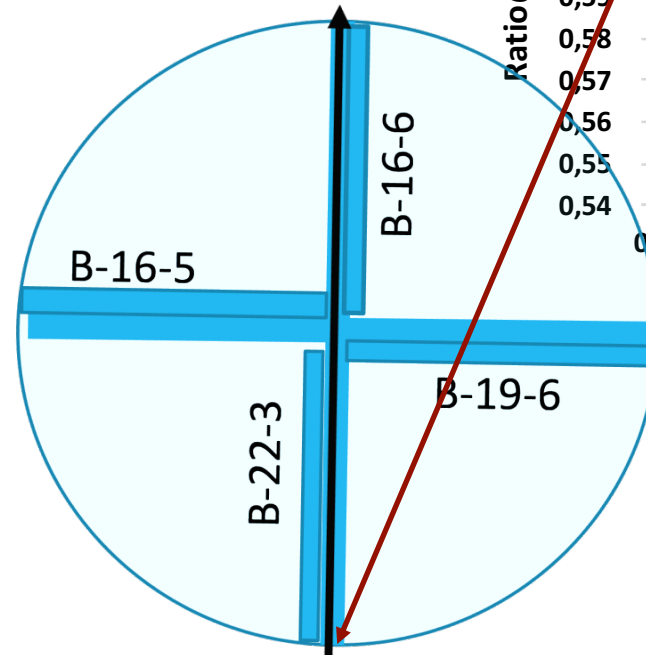


The irradiation level of 19-6 is much lower than 16-5

FBK-UFSD3-W1 Altiroc 19-6 & 16-5  
Trend from left to right

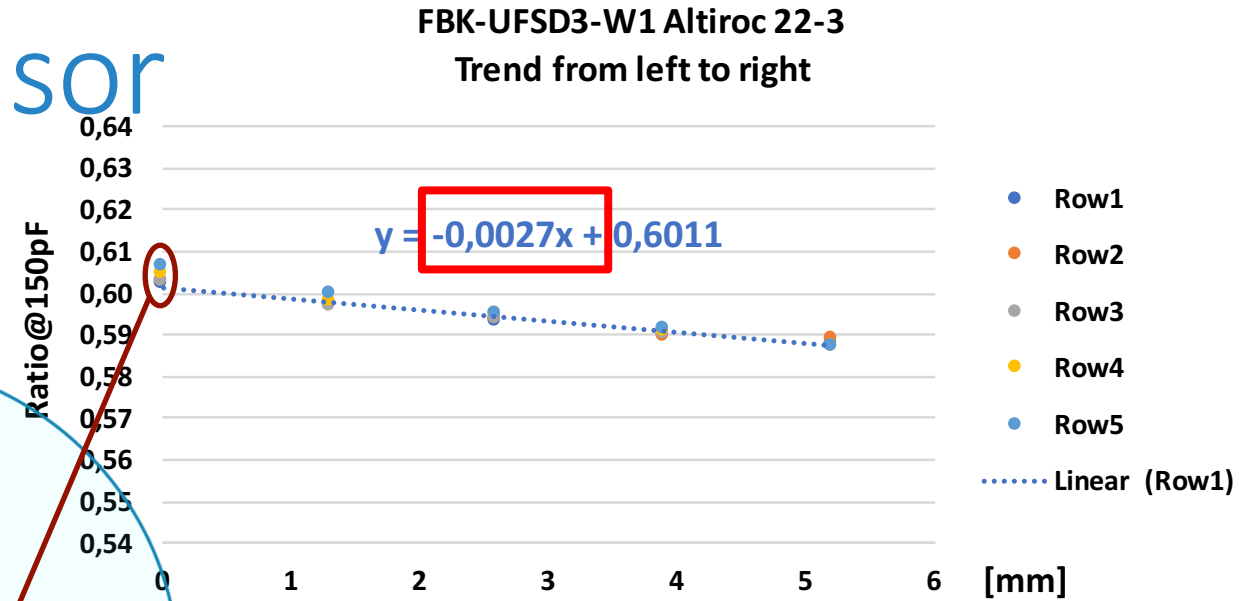
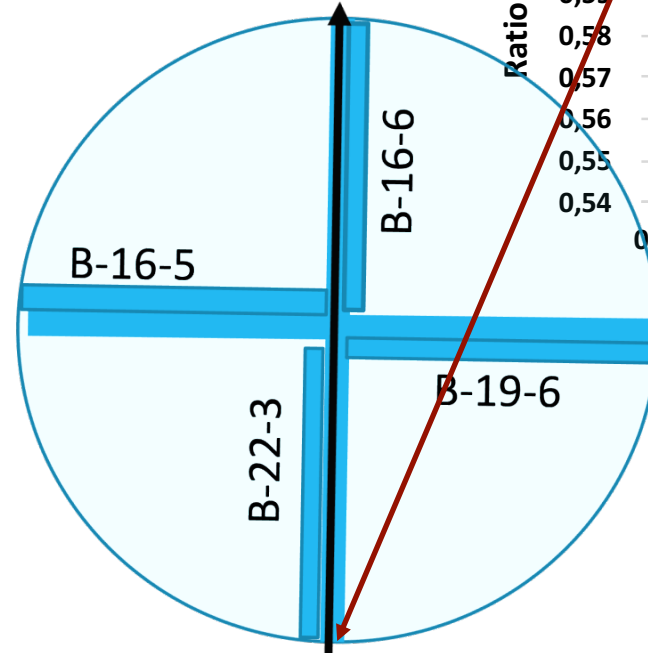


# Horizontal Trend - UP



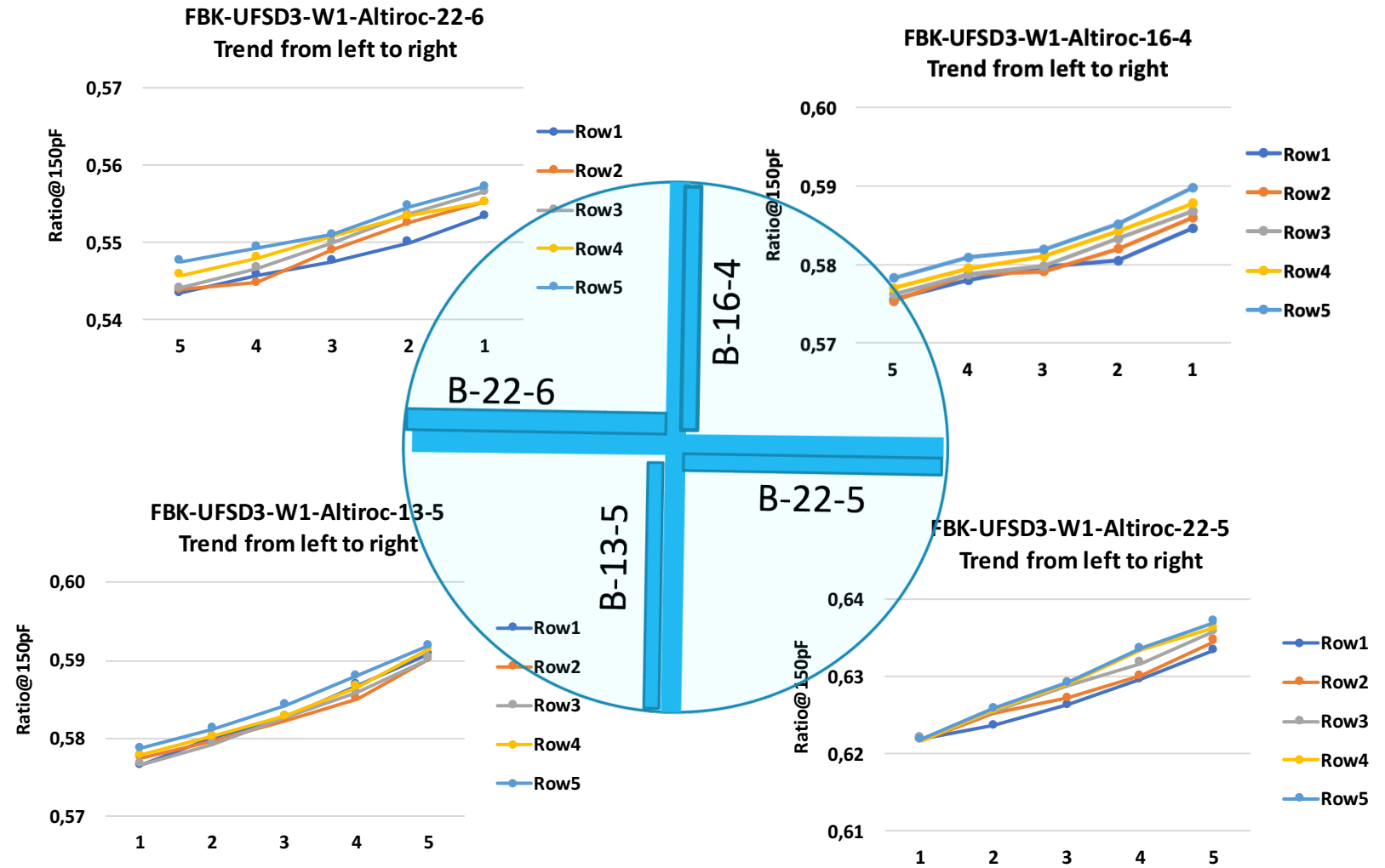
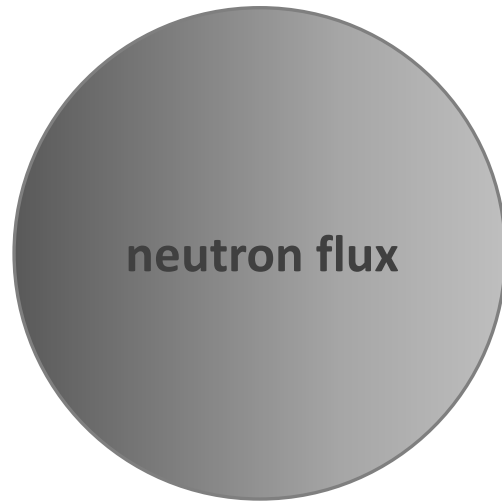
**No particular difference  
between the two sensors**

# Horizontal Trend - 1 sensor

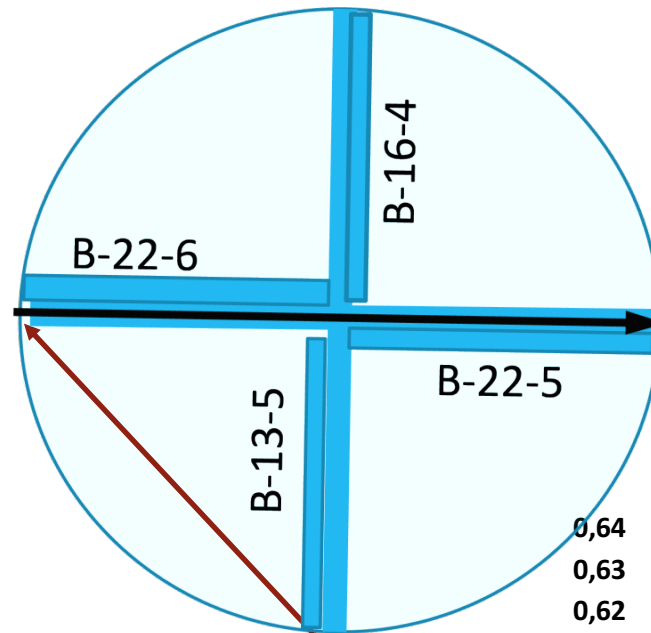


$\text{atg}(-0,0027) \sim 0$

# Horizontal Trend - DOWN

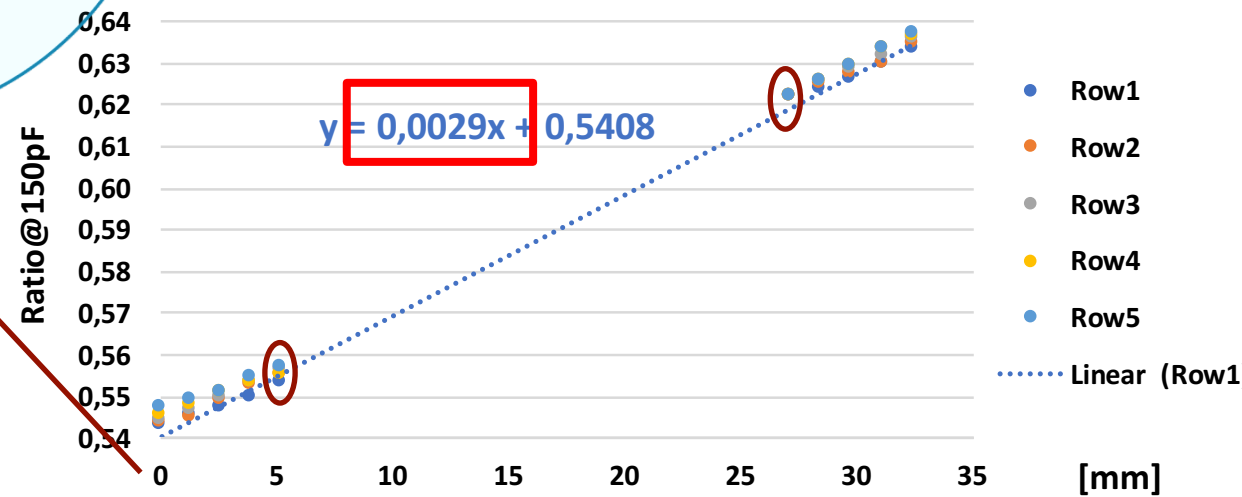


# Horizontal Trend - DOWN

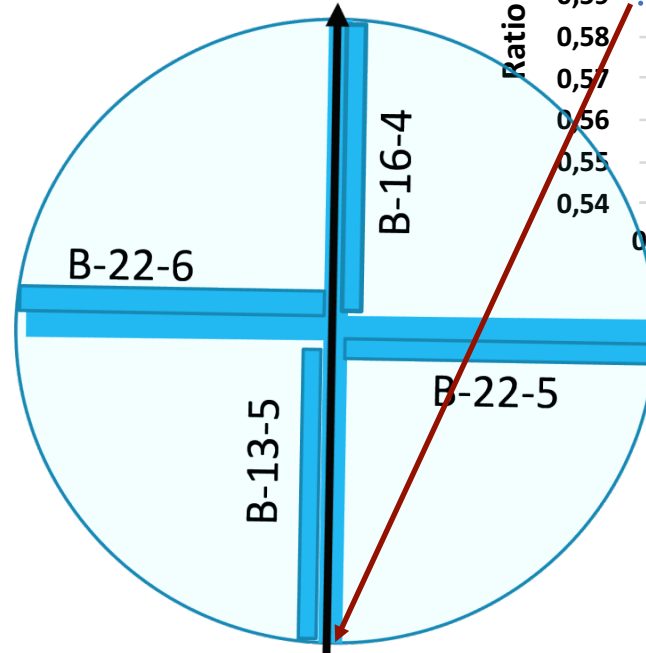


The irradiation level of 22-5 is much lower than 22-6

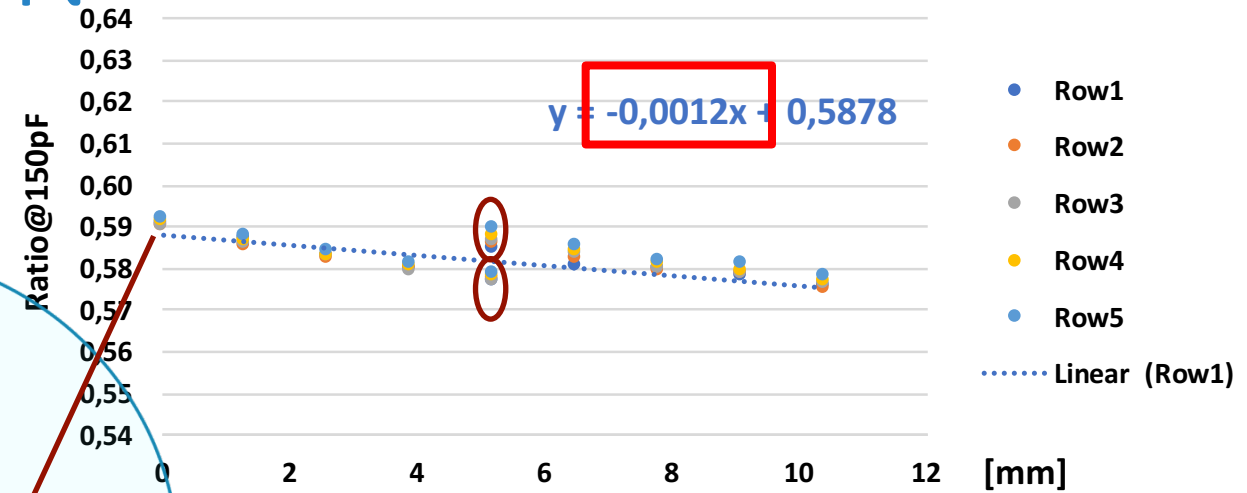
FBK-UFSD3-W1 Altiroc 22-5 & 22-6  
Trend from left to right



# Horizontal Trend - DOWN



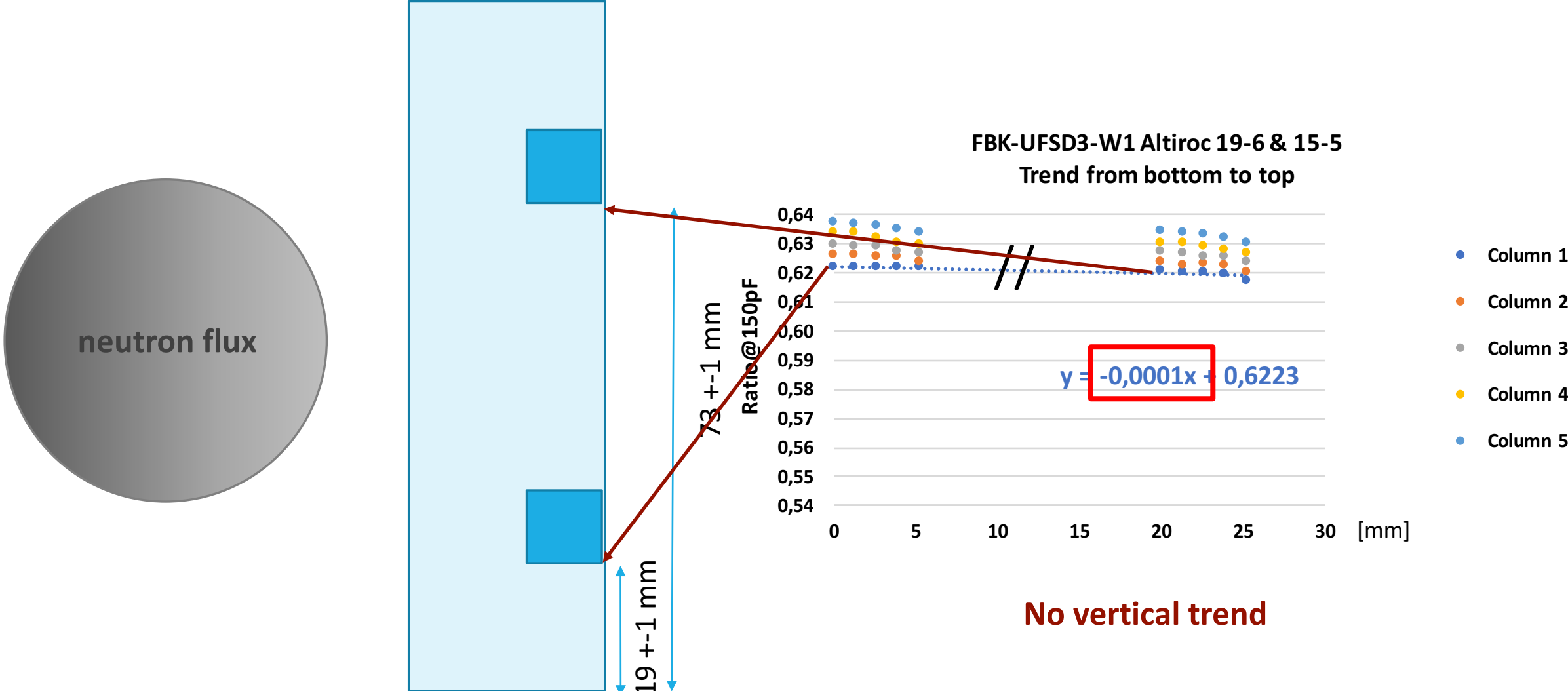
FBK-UFSD3-W1 Altiroc 13-5 & 16-4  
Trend from left to right



**No particular difference  
between the two sensors**



# Vertical Trend



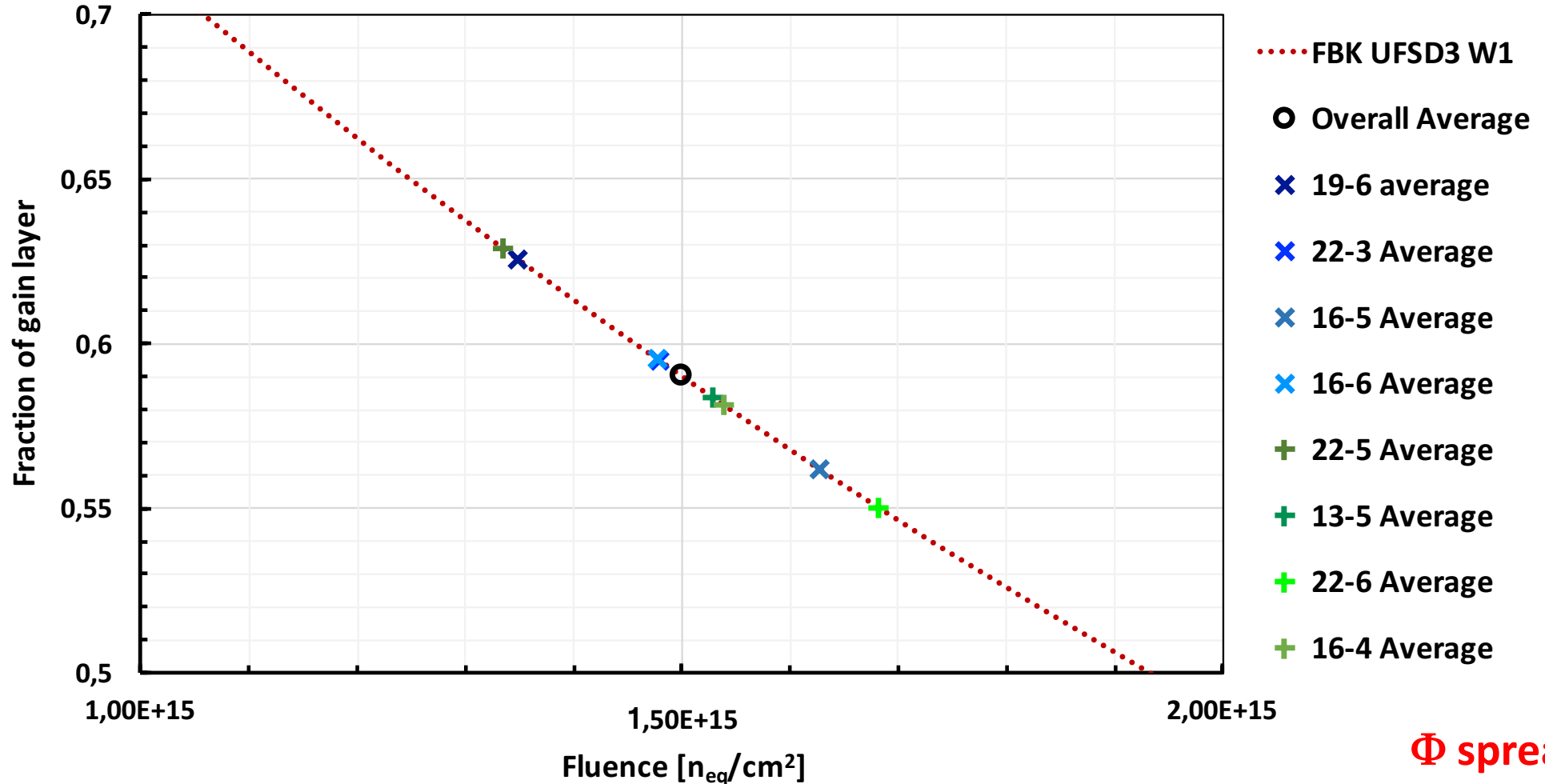
# Some Statistics

	W1 B1 13-5	W1 B1 16-4	W1 B1 16-5	W1 B1 16-6	W1 B1 19-6	W1 B1 22-3	W1 B1 22-5	W1 B1 22-6	<ave>
<b>NEW</b>									
average	22,38	22,13	22,17	22,30	22,36	22,15	22,25	22,23	22,25
ave - <ave>	0,13	0,11	0,08	0,06	0,11	0,10	0,00	0,02	
RMS	0,07	0,11	0,11	0,08	0,09	0,10	0,09	0,08	0,05
RMS/ave*100	0,54	0,83	0,88	0,57	0,63	0,78	0,67	0,69	
<b>1.5E15</b>									
average	13,06	12,87	12,45	13,28	13,99	13,17	13,99	12,24	13,13
ave - <ave>	0,07	0,27	0,68	0,15	0,86	0,04	0,86	0,90	
RMS	0,07	0,11	0,11	0,08	0,09	0,10	0,09	0,08	0,09
RMS/ave*100	0,54	0,83	0,88	0,57	0,63	0,78	0,67	0,69	

# Converted into Fluence - ZOOM

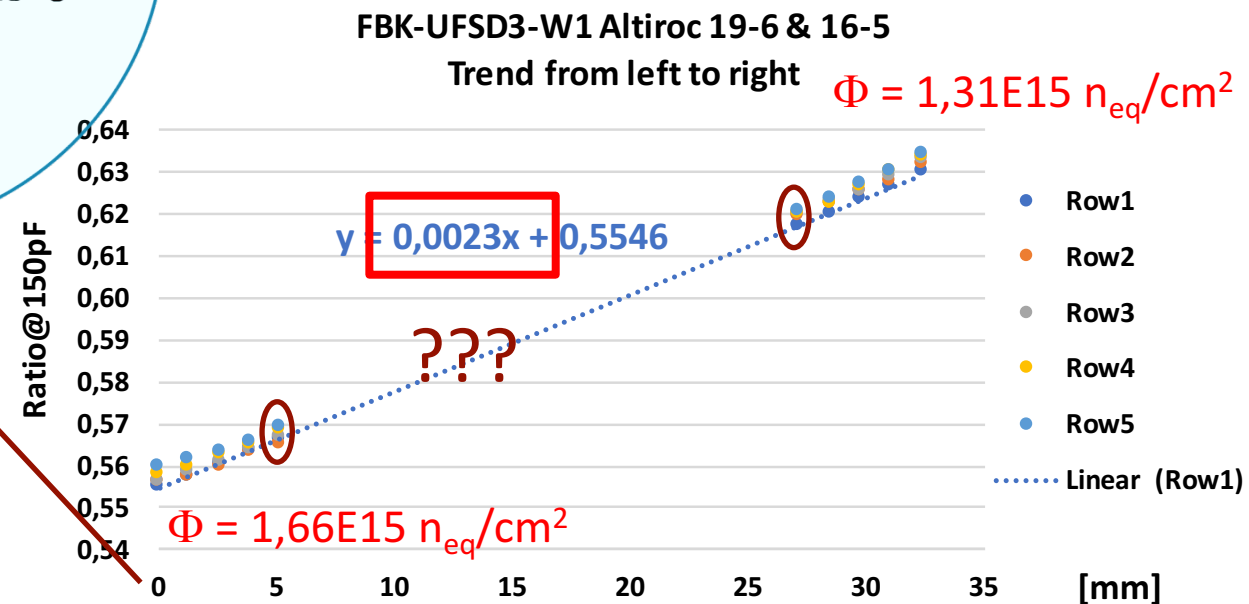
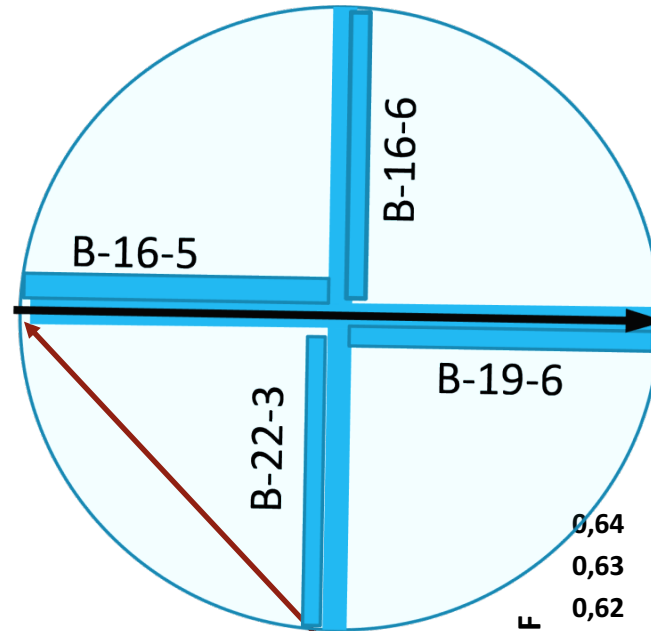
Using MF parametrisation presented  
at 34<sup>th</sup> RD50 Workshop (Lancaster, UK)

### Acceptor removal curve

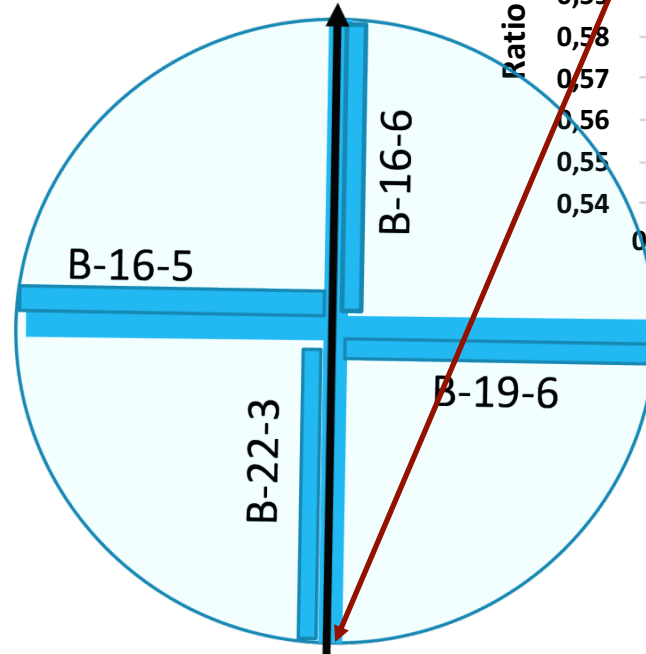


$\Phi$  spread = 25%

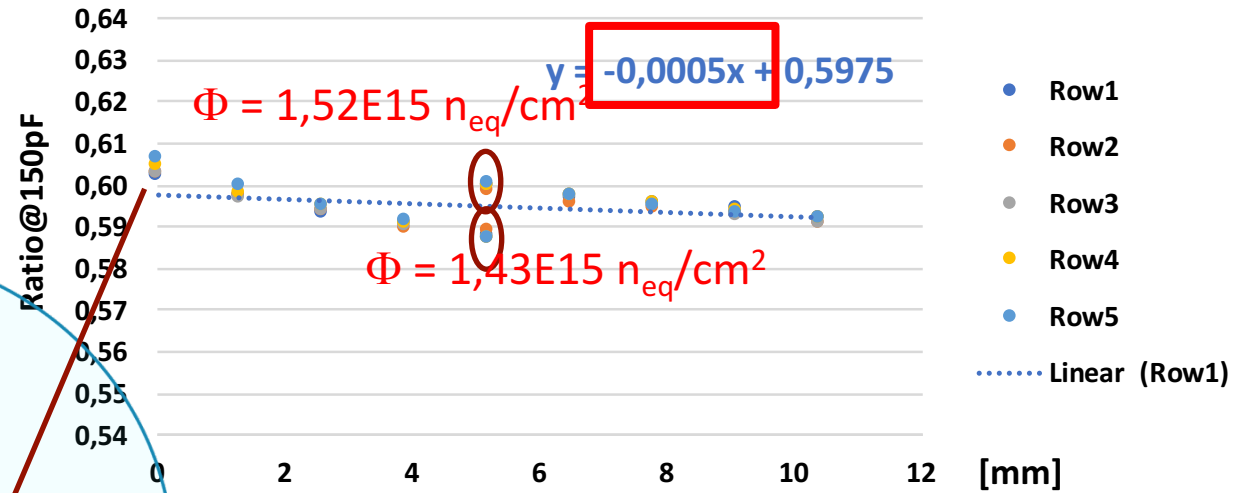
# Horizontal Trend - UP



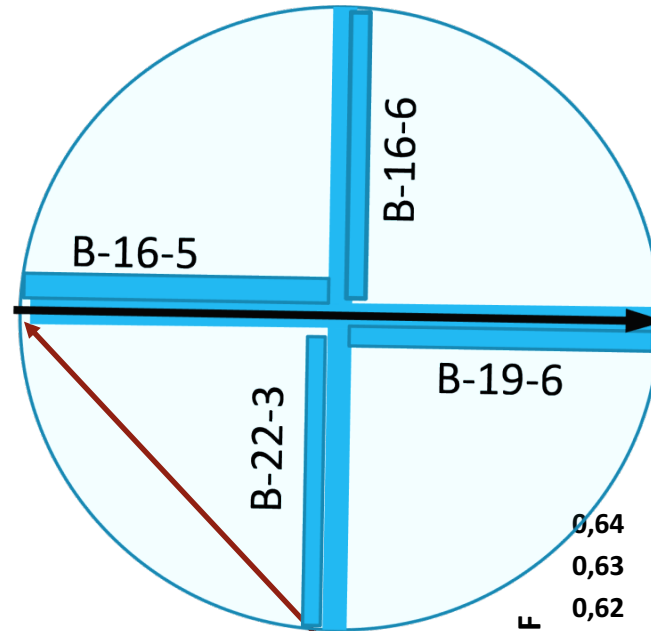
# Horizontal Trend - UP



FBK-UFSD3-W1 Altiroc 22-3 & 16-6  
Trend from left to right



# Overall Horizontal Trend - UP



Also the irradiation level of 22-3 is lower than 16-5

Why the columns 1 experienced such different values of fluence?

FBK-UFSD3-W1 Altiroc 19-6 & 22-3 & 16-5  
Trend from left to right  $\Phi = 1,31E15 \text{ n}_{eq}/\text{cm}^2$

