



千才生醫股份有限公司
Leverage Biomedical Inc.

張新棠 總經理

LIGHTING Your LIFE



千才科技股份有限公司
Leverage Technology Inc.

張新棠 副總經理

Enjoy Your Life 1



Dr. GAU, the chairman of Leverage Biomedical, started to study the LED phototherapy in medical beauty and finally established Leverage Biomedical in 2013, a subsidiary of Leverage Technology, and was allowed to enter the Hsinchu Biomedical Science Park.

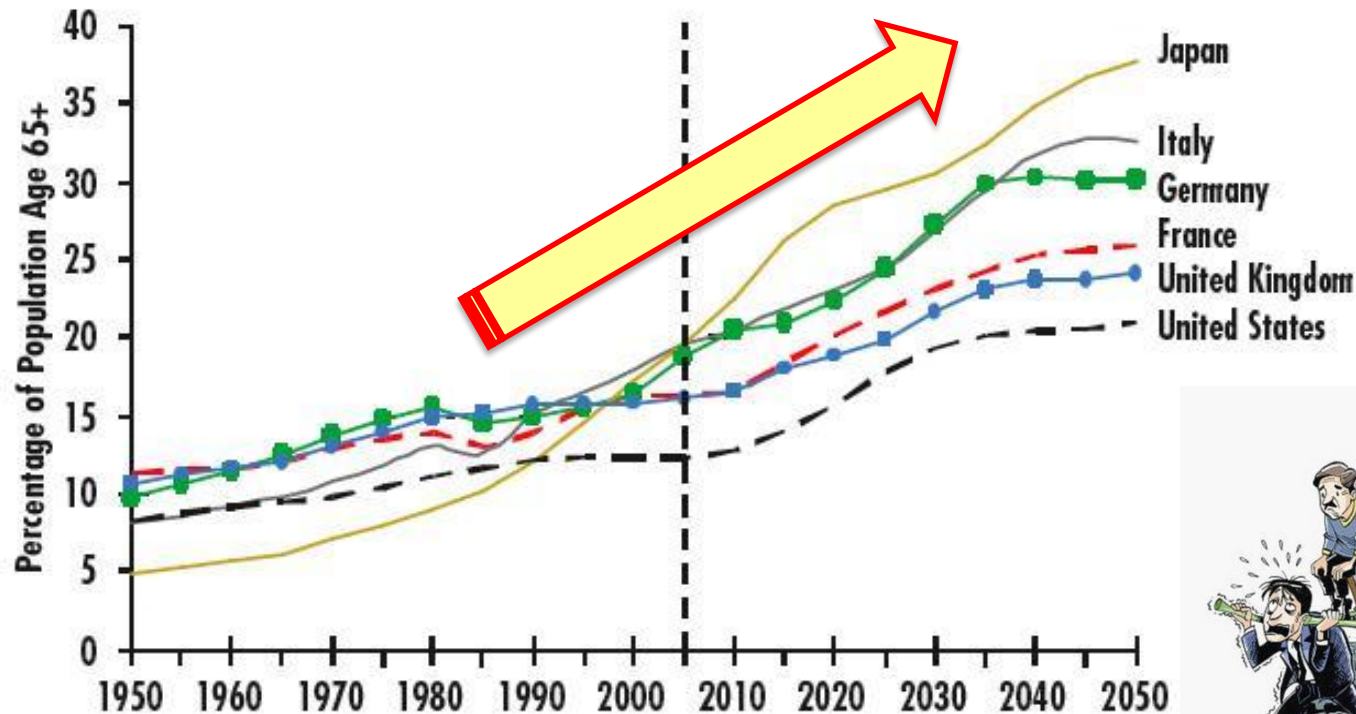


2013 Spinoff LBI



The company's core competitiveness includes the biomedical field, optoelectronic packaging and production technology, laser welding technology, glue-solid packaging technology, precision opto-mechanical development and design integration, and strict raw material quality control processes to achieve the goal of high-efficiency mass production.

Tendency



Source: United Nations World Population Prospects: The 2006 Revision, Medium Variant

**What kind of problems will be brought by
global aging population?**



面對人口的老化,著力創造能讓大家感到幸福的平台

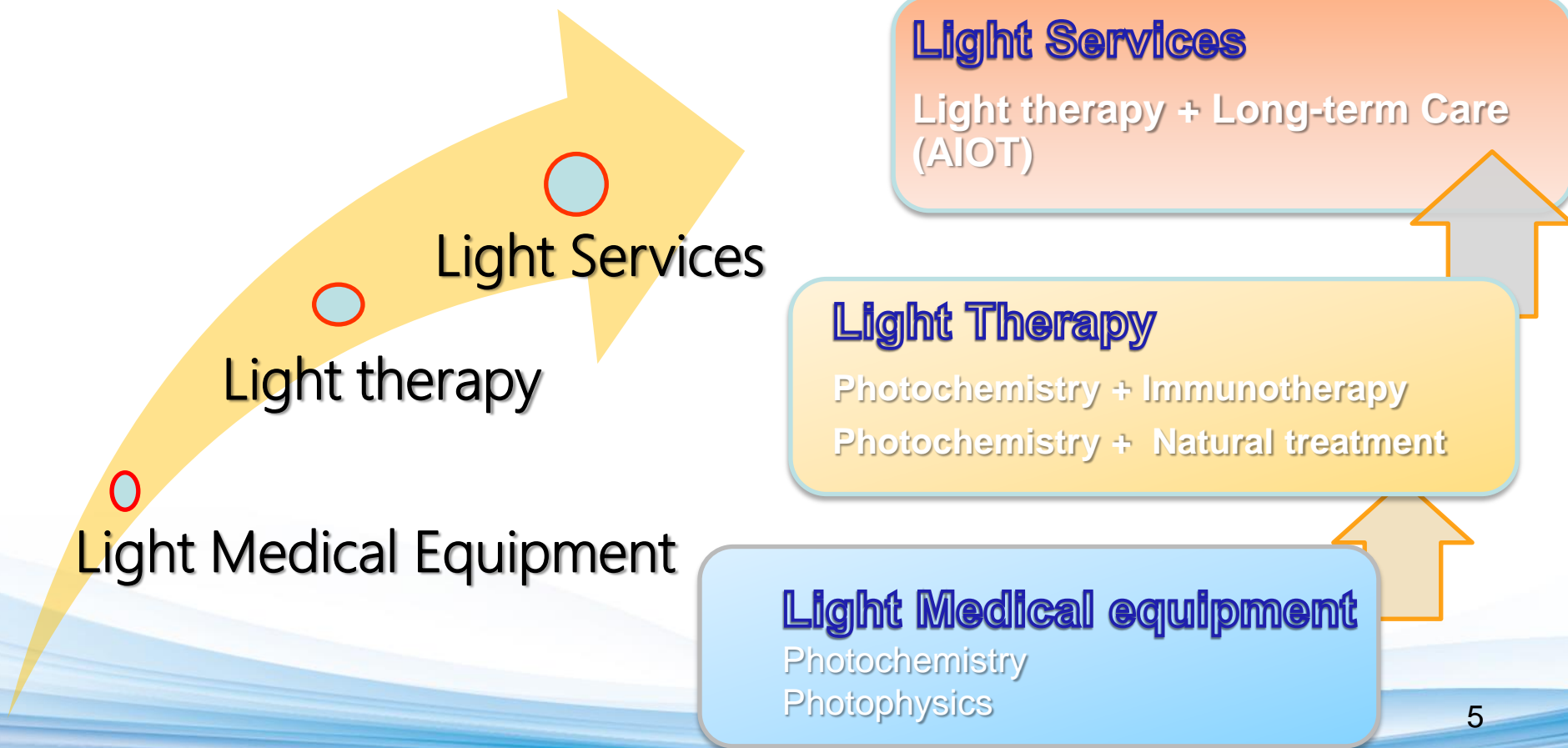
Under the trend of aging global population, our vision is

To create a platform to let people physically healthy and mentally happy.

How to do



Our long-term goal is to become a company able to provide
"Full Services of Photo Therapy".



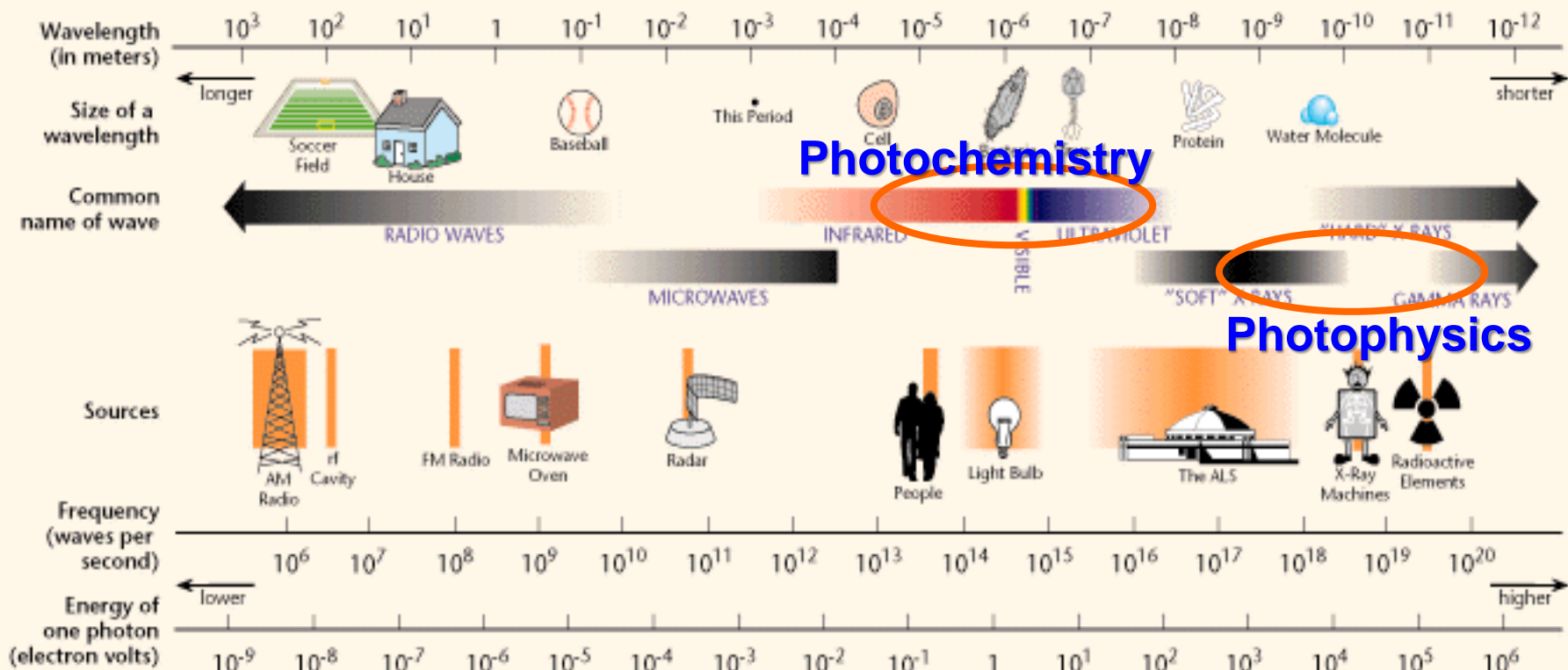


LIVERAGE BIOMEDICAL INC

Products



THE ELECTROMAGNETIC SPECTRUM



Photochemistry

Photophysics

Our main products are divided into photochemistry and photophysics



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Products Road Map



Photophysics



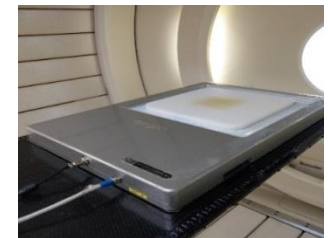
Proton QA



Photon QA

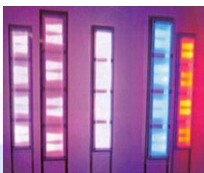


X-Ray DAP

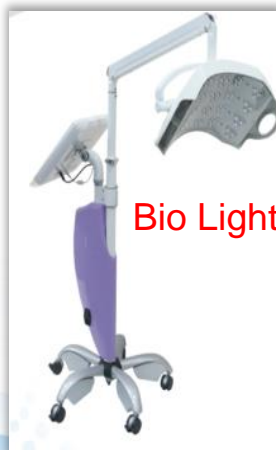


Carbon QA

Photochemistry



Good night Light



Bio Light



LED Mask



Endo Scope Lighting



ILIB



Bio Light Fitness



UVC LED Lighting

2013 2014
Confidential

2015

2016

2017

2018

2019

2020

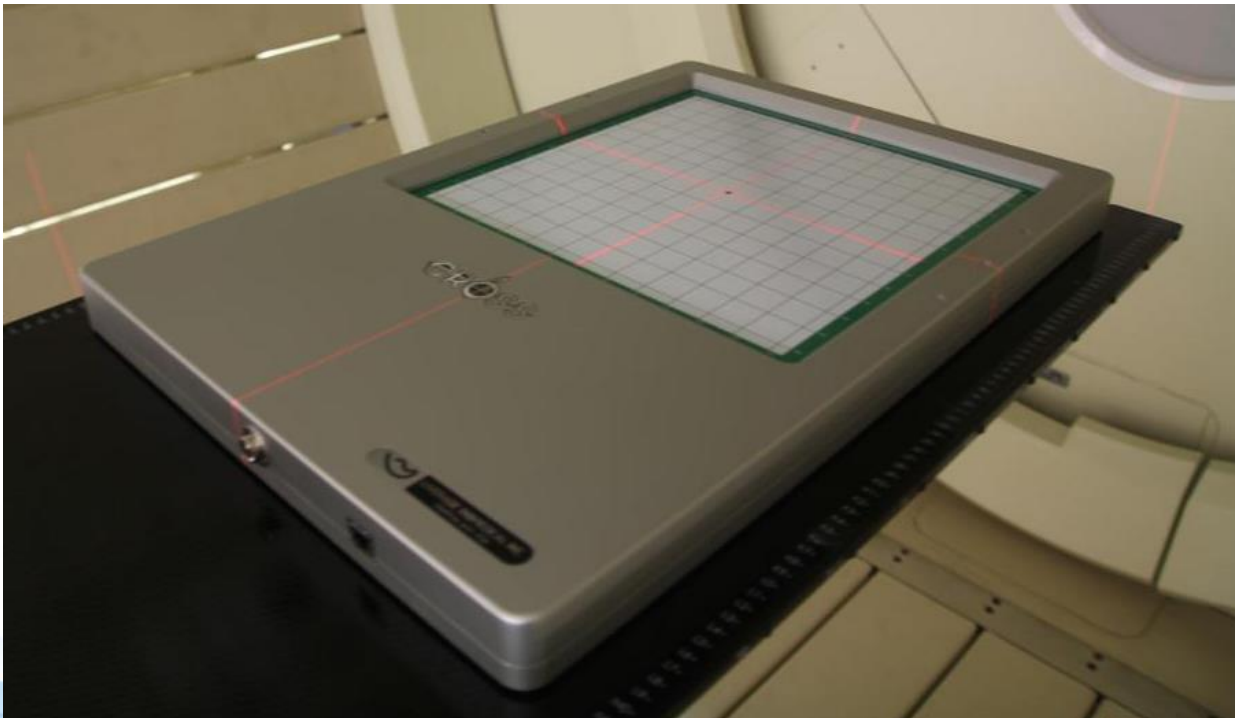
2021

2022



Proton Therapy QA equipment

CROSS





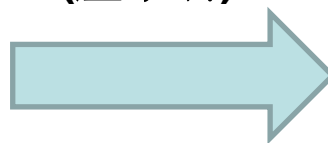
中央研究院物理研究所



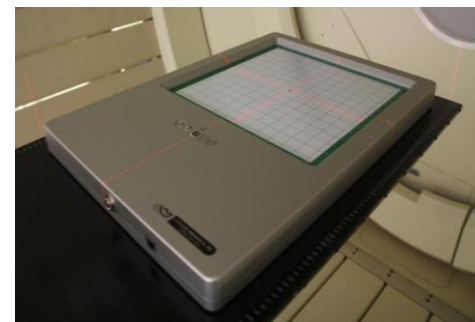
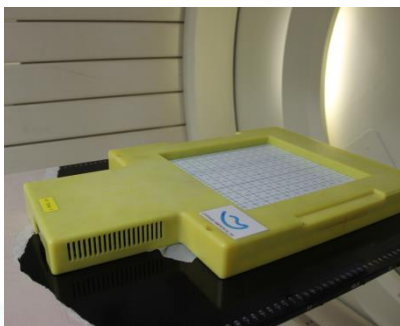
國立中央大學物理學系

CROSS

產學合作技轉
(產學研)



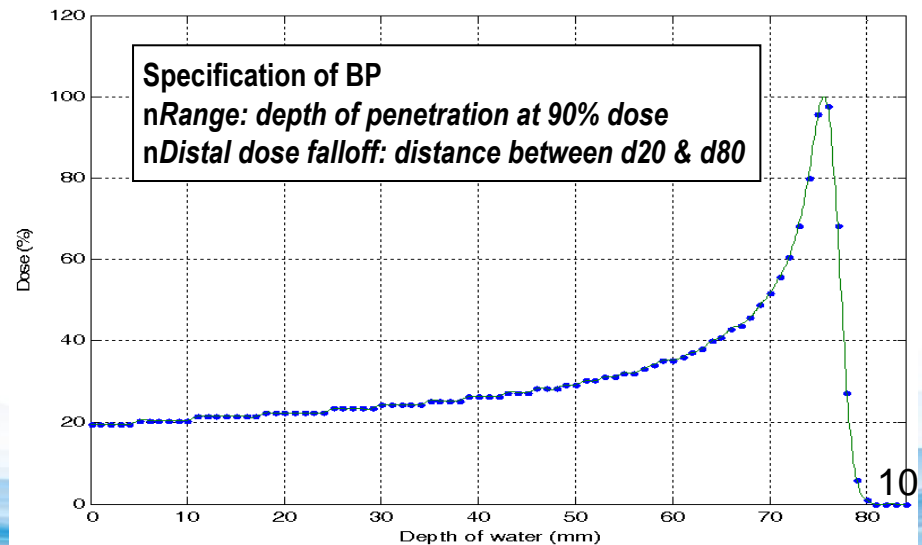
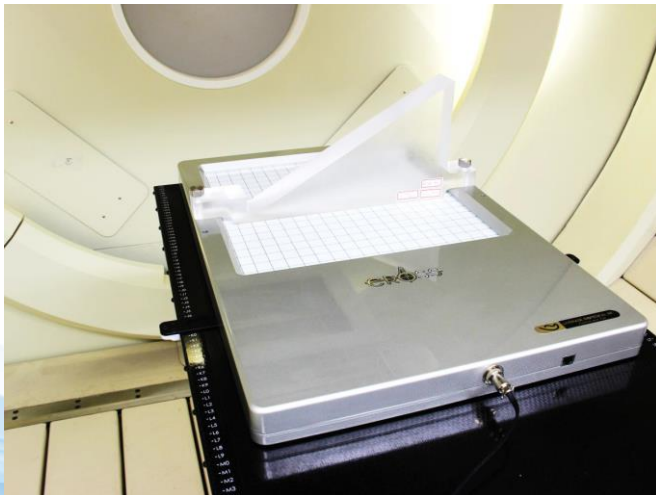
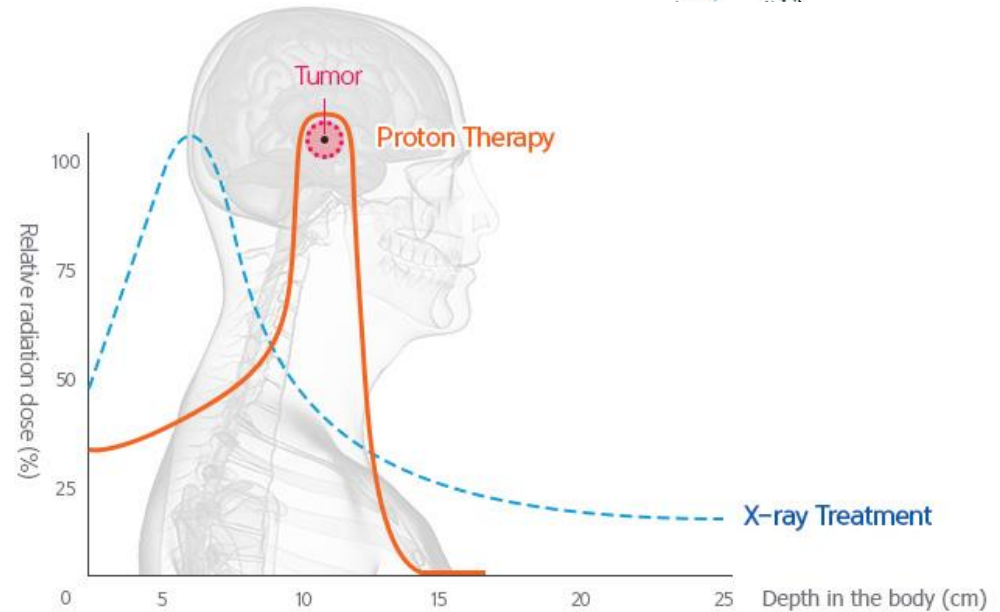
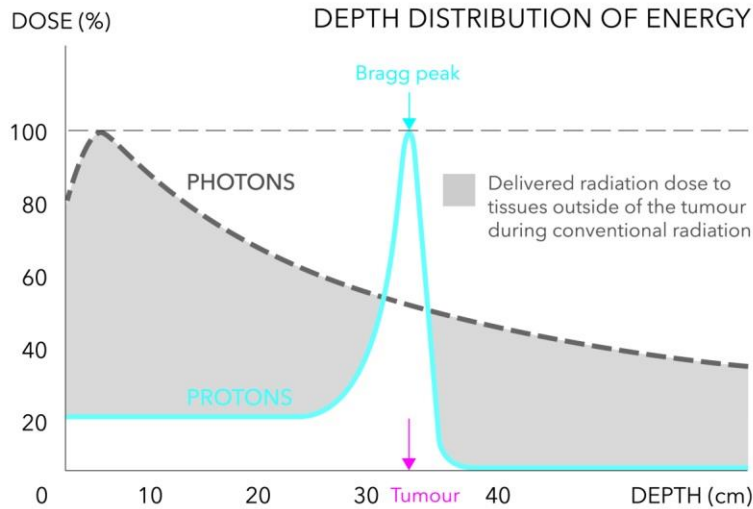
千才生醫股份有限公司



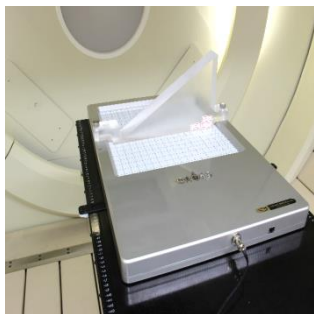


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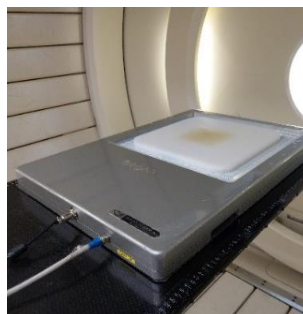
質子刀特性簡述



Efficiency Solution for PBS Machine Daily QA

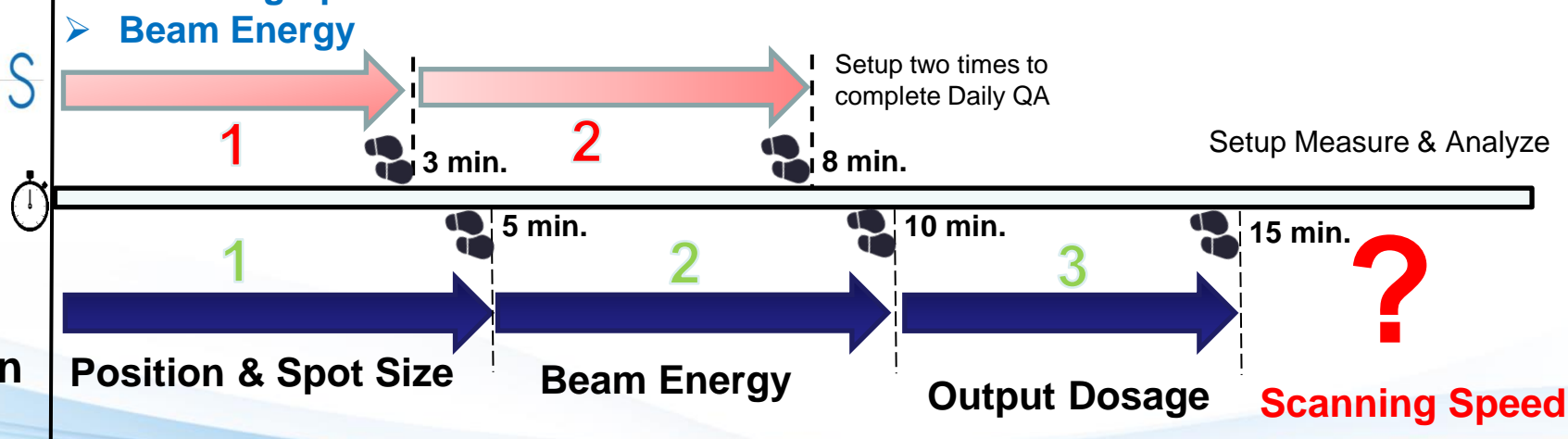


(PMMA Wedge on the top)



(Replace Wedge by Solid Water)

- **Position & Spot Size**
- **Spot Exposure Time**
- **Scanning Speed**
- **Beam Energy**
- **Output Dosage**



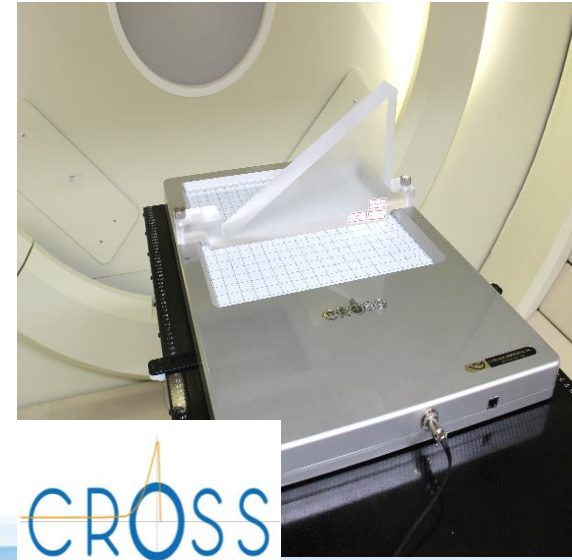


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Advantages of CROSS



- **Extremely High Spatial Resolution : ~0.2 mm**
- **Extremely Fast Acquisition Rate : 20,000 Hz**
- **Wide Active Area : 330 x330 mm²**
- **Scanning Speed Measurement : up to 20 M/sec**
- **Single Solution For All PBS Machine QA Requirements**
 - **Each Spot Exposure time**
 - **Beam Position**
 - **Spot Size**
 - **Scanning Speed**
 - **Depth Dose Distribution**
 - **Output Dosage**
- **Easy Installation : 1 minute to setup**





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Summary of position and spot size measurement

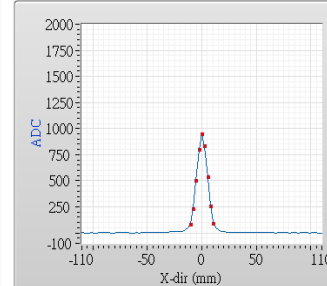
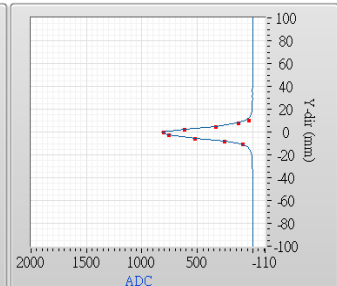
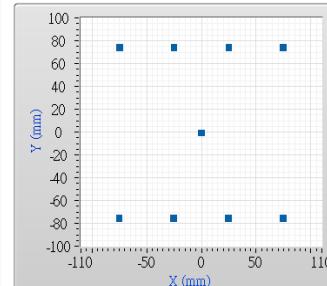


		PT1	PT2	PT3	PT4	PT5	PT6	PT7	PT8	PT9
Expected Position	X	-75	-25	25	75	75	25	-25	-75	0
	Y	75	75	75	75	-75	-75	-75	-75	0
Measured Position	X	-74.72	-24.96	24.98	74.86	74.66	24.77	-25.19	-74.96	-0.04
	Y	74.12	74.06	74.00	73.93	-75.73	-75.72	-75.69	-75.66	-0.95
Distance Deviation		0.92	0.94	1.00	1.08	0.81	0.75	0.71	0.66	0.95
Spot Size (FWHM)	X	11.07	11.23	11.27	11.13	11.18	11.31	11.13	11.00	11.04
	Y	10.95	10.93	10.92	10.89	10.76	10.76	10.78	10.80	10.80

PT1 - PT8 Spot size		Baseline	Average	Std	Max. Diff. point
Tolerance (mm)	X	10.49	11.17	0.10	PT6
	Y	10.51	10.85	0.08	PT1

PT1-PT8 Max Position Deviation	
Tolerance (mm)	PT4
	1.08

Beam Size & Position control accuracy pattern



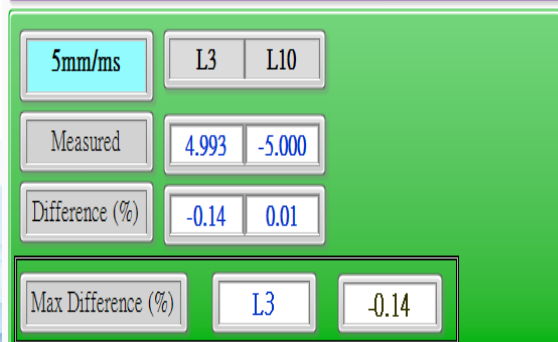
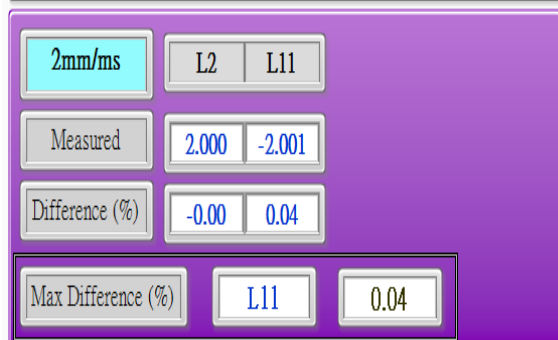
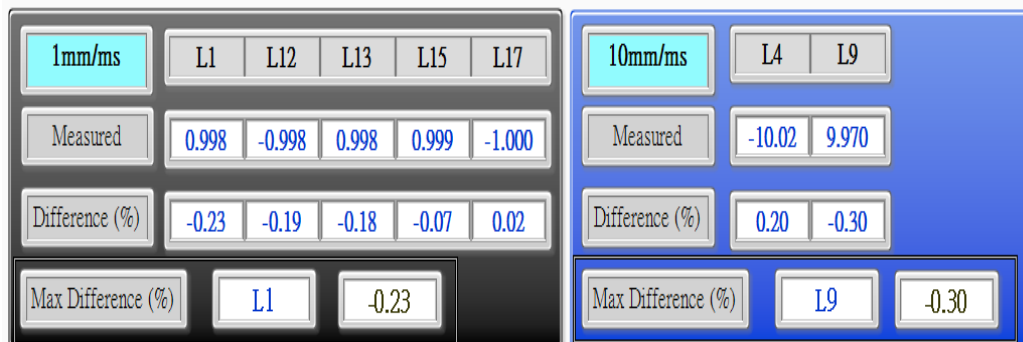
Gaussian fitting (evens)

Start event: 2000
End event: 7000
counter: 9986

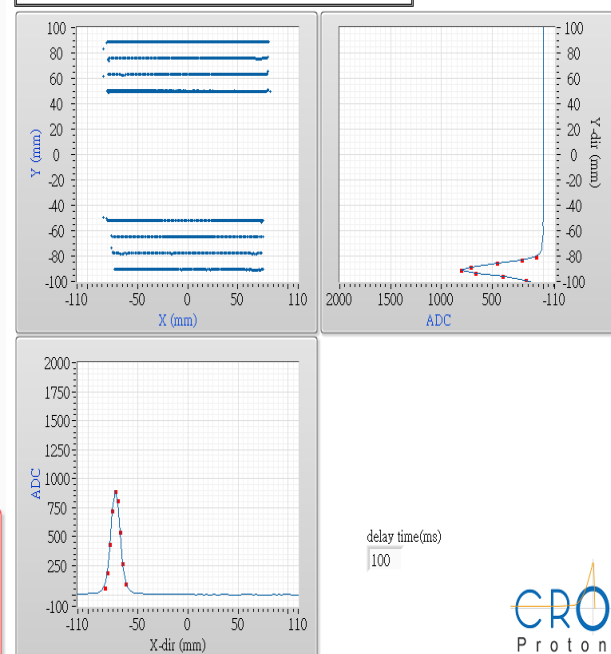
delay time (ms): 0



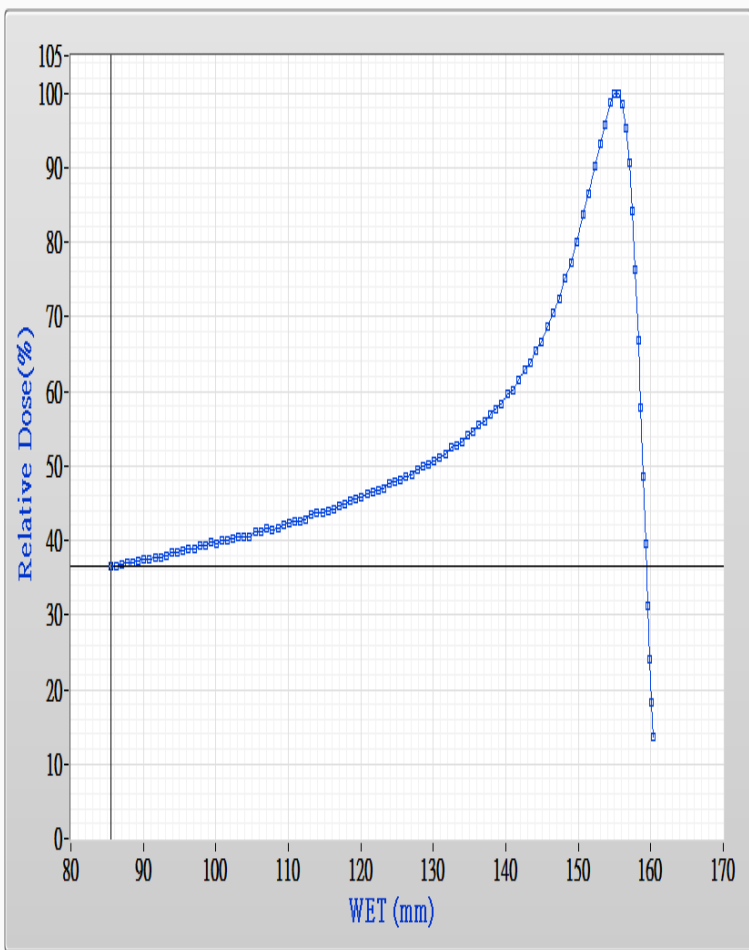
Summary of scanning speed measurement



Beam Scanning Speed control accuracy pattern



Summary of beam energy measurement



Baseline *Not measure results!!*

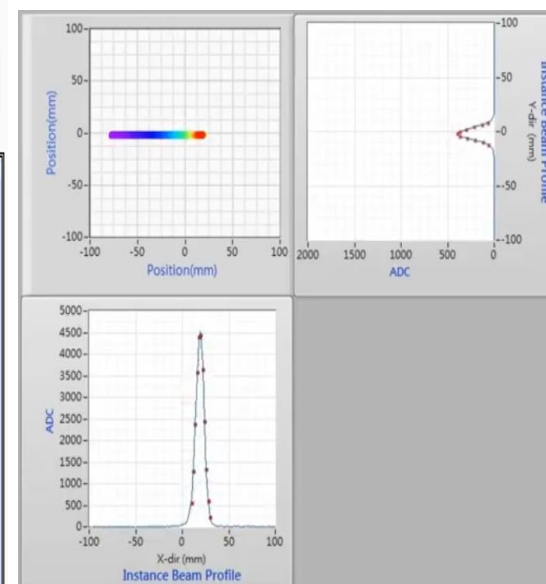
R80d 157.10 BP width 4.79

Unit: mm

Measure Results

R90p	Rpeak	R90d	R80d
152.20	155.00	157.10	157.68

BP Width (R90d - R90p) 4.90





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Summary report



PG4 ONLY

2016\11\16

Cai Siou-Yin

150 MeV

Mid energy wedge ver2
(120MeV-170MeV)

C:\CROSS\Meas_Results\11_16_2016\Data\
CROSS_001_150MeV_07_58_17.dat

Beam Size & Position control accuracy

Beam Scanning Speed control accuracy

Depth dose distribution constancy

Meas. Result

Depth dose distribution constancy

R80%

157.52

Unit: mm

BP90%-90%

4.70

Beam scanning speed control accuracy

Max. Speed Diff. (%)

mm/ms

1

2

5

10

15

20

-0.34

-0.22

-0.38

-1.02

-0.97

1.92

Beam size constancy (Max.)

X (mm)

Y (mm)

10.59

10.44

Beam position control accuracy

Max. Deviation (mm)

Unit: mm

1.77

Unit: mm

Depth dose distribution constancy

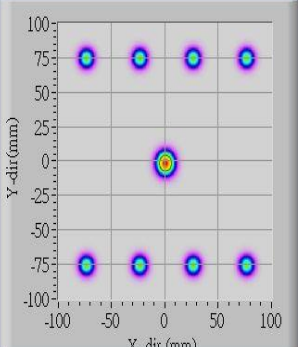
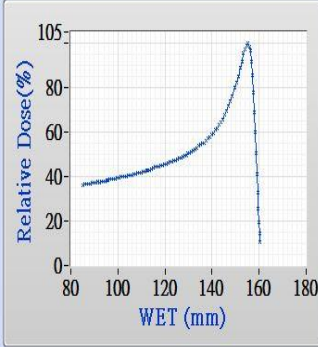
Beam Size & Position control accuracy

Relative Dose(%)

WET (mm)

Y-dir(mm)

X-dir (mm)

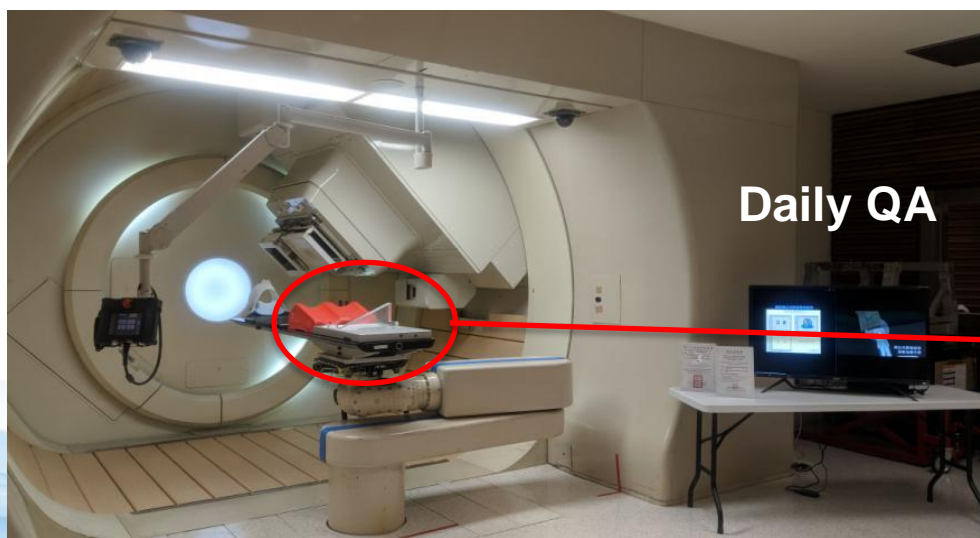
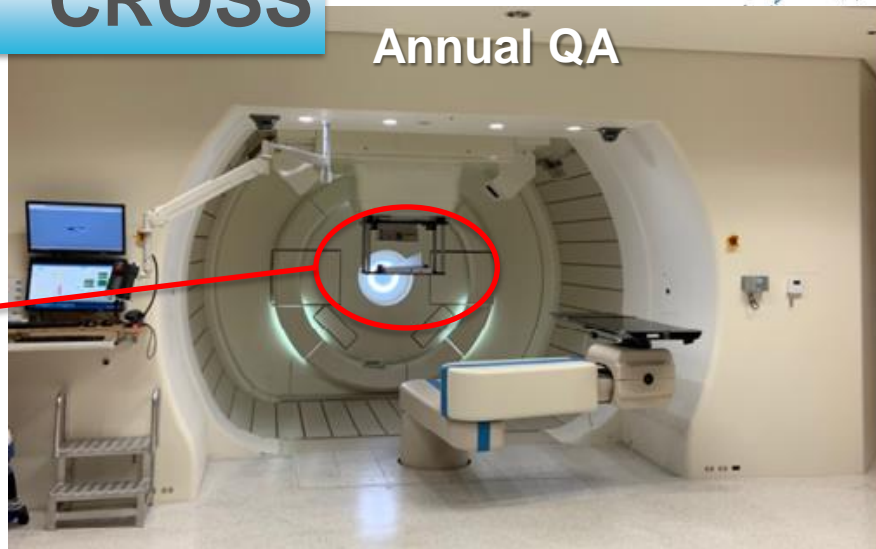
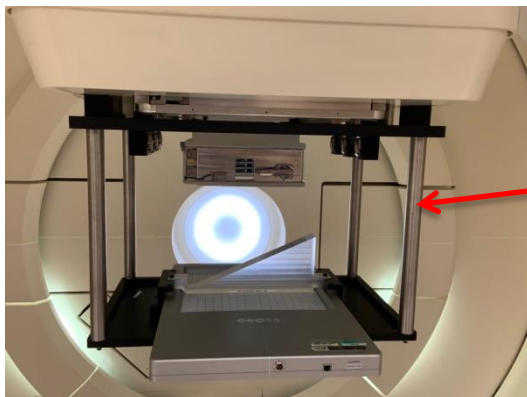


CROSS
Proton QA



CROSS

Annual QA



Daily QA



For Daily QA / Annual QA of Proton Therapy facility

CROSS specification



Specifications	CROSS	CROSS mini
Chamber type	Parallel Plate Ionization Chambers	
Active area	33 x 33 cm ²	25.4 x 25.4 cm ²
Sensor pitch	2.6 mm center to center	2 mm center to center
Beam position resolution	0.2 mm	0.1 mm
Number of channels	254	
Measuring frequency	Max. 20,000Hz	
Interface	USB 2.0 Via Cat5e (Max. 100M)	
PC interface	PC with a USB 2.0 extender	
Power supply	Input: 100 – 240 VAC , 50 / 60 Hz	
Dimensions	62 (L) x 42 (W) x 4 (H) cm ³	55 (L) x 36 (W) x 4 (H) cm ³
Weight	7 kg	5.5 kg
Positioning	Nozzle mount (holder optional) or couch	

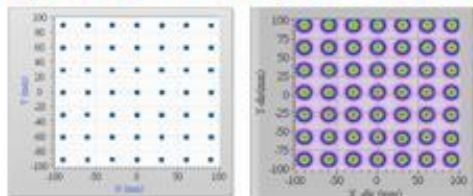


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Proton PBS Fast and Precise QA Solution

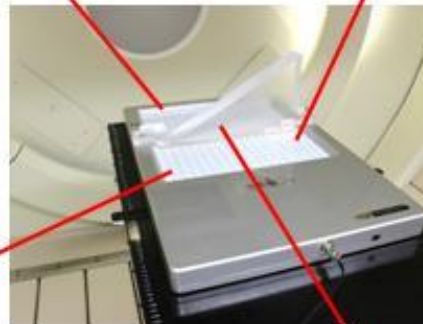
QA1: Position & Spot size validation



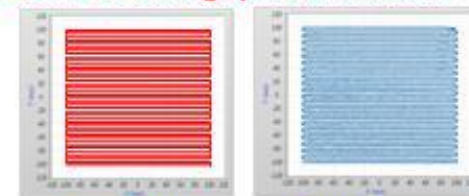
Scanning pattern

Raw data

- Extremely High resolution ~0.2mm
- Wide active area up to 33x33 cm²



QA2: Scanning speed validation



Scanning Pattern

Raw data

- Extremely High acquisition rate: 20KHz

QA4: Output dosage validation

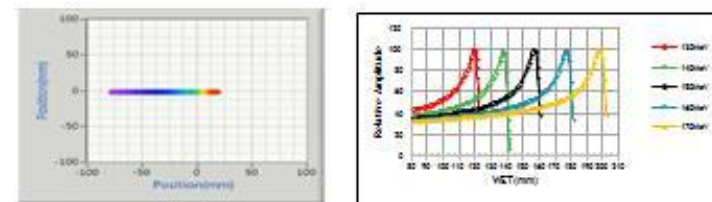


Scanning pattern

Raw data

• Without PMMA Wedge

QA3: Depth dose distribution validation



- Wide beam energy range (70MeV~230MeV)



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Thank you for your attention



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