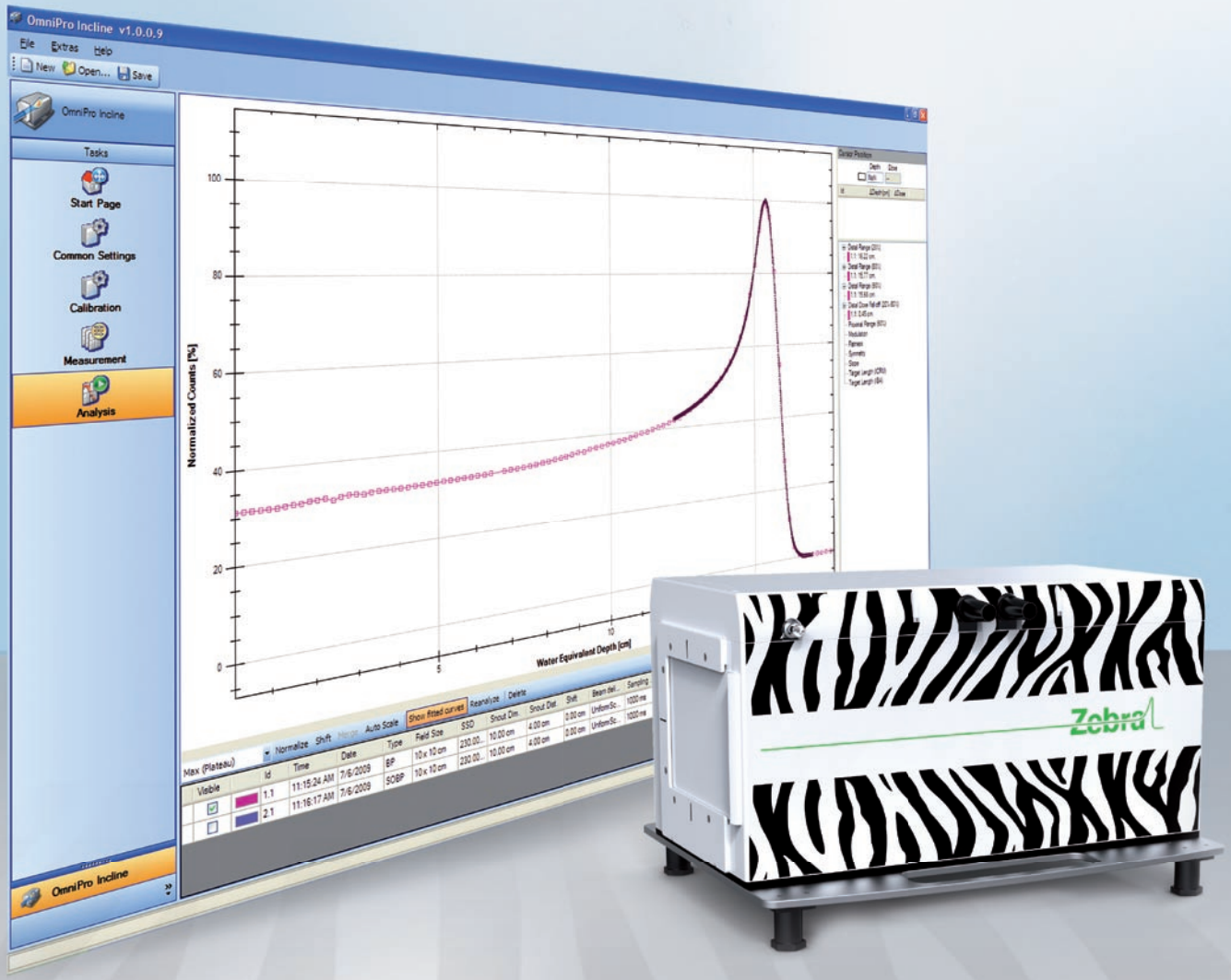
Zebra with OmniPro-Incline

High precision Particle Therapy Dosimetry



Consolidation of IBA's unique expertise in Dosimetry and Particle Therapy

Over the last 15 years IBA Particle Therapy has designed and equipped over half of the clinical-based Proton Therapy facilities in the world. IBA integrates the entire experience in cancer treatment, from patient diagnostics to treatment, including interfaces with existing oncology infrastructure, treatment planning and information systems.

By consolidating experiences with IBA Dosimetry, a solution specifically tailored for Particle Therapy Dosimetry was developed. The successful outcome is *Zebra with OmniPro-Incline*.

Zebra is a unique multi-layer ion chamber device including the specialized application software OmniPro-Incline and a high sensitivity multi-channel electrometer based on the well-known ASICs technology.

With Zebra and OmniPro-Incline you will be able to measure the depth dose distribution for particles the fastest, most accurate and most reliable.

The first integrated and comprehensive solution for Particle Therapy to measure and analyse Bragg-peaks (BP) and Spread out Bragg-peaks (SOBP) with only one click!

- fast and efficient set-up
- verification of the single as well as modulated peak in only one measurement
- ionization chamber detectors
- simultaneous read-out of all chambers
- high native resolution: 2 mm detector spacing along the beam axis

QA routine made simple through state-of-the-art technology

A high spatial resolution system

With a stack of 180 independent vented plane parallel ionization chambers, a native resolution of 2 mm and a circular shaped collecting electrode which presents a diameter of 2.5 cm, the measurement of both BP and SOBP becomes possible over the full clinical range within the sub millimeter accuracy.

A water equivalent device

Thanks to the experience acquired with the PIC technology, the Zebra detector has been designed with the appropriated materials in order to assemble a water equivalent device. The thickness of each electrode has been chosen to be approx. 1 mm for a 2 g/cm^3 density coupled with an air gap separating each electrode fixed to 1 mm. The resulting consequence of such a design is a geometrical length of the device analogous to its water equivalent one.

A dedicated multi-channel electrometer

The Zebra is used in combination with a dedicated multi-channels electrometer. The electrometer system is based on the ASICs technology designed to measure with acquisition period down to 10 ms without loosing any data. The readout of the 180 chambers of Zebra is performed simultaneously; this unique feature offers a tremendous advantage for the measurement of scanned beams.

Fast user uniformity calibration

The Zebra comes from factory with a complete uniformity calibration. The design has been made with the state of the art technology as for MatriXX (Pixel Ionization Chamber Technology) and ensures highest stability. However, the application offers the possibility of fast recalibration in uniformity on the customer site using methods based either on Proton or Photon radiations.

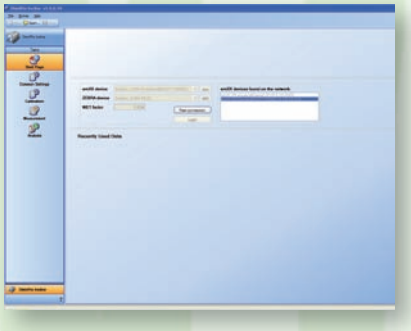
Comprehensive analysis workspace

The analysis module of OmniPro-Incline provides all the necessary tools to properly and rapidly measure the fundamental Dosimetry parameters like the range or the modulation of depth dose profiles, Bragg-peaks (BP) or Spread out Bragg-peaks (SOBP). Measurements can easily be set up or generated automatically with the intuitive graphical environment. The measured data are visualized in a clear, informative way to allow fast and precise analysis.

Everything you need to see in your Bragg-peak

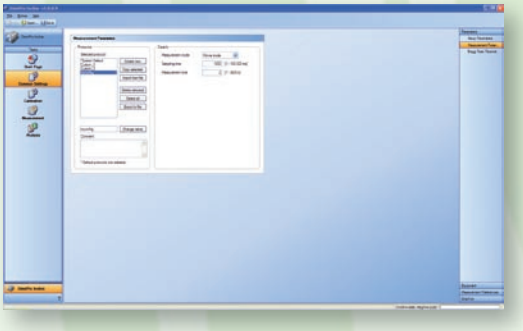
OmniPro-Incline is the advanced software platform for fast and accurate quality assurance in Particle Therapy. It incorporates the latest software technology with an intuitive graphical environment, allowing for easy set-up or automatic generation of measurements. The measured data is visualized in a clear informative way for fast and precise analysis.

Start Page



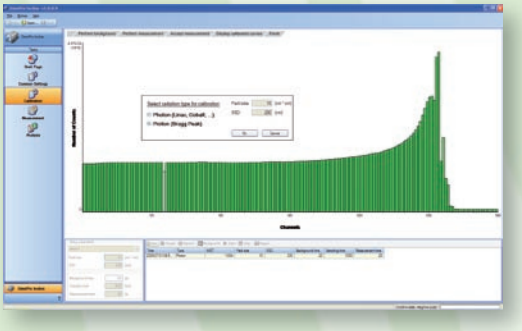
- Truly workflow oriented with easy access to essential workspaces on the left of the screen
- Easy access to common measurement and set-up parameters through common settings workspace

Common Settings



- Easy definition of the set-up parameters, as e.g. Source to Skin Distance (SSD), applied field size, snout characteristics (if applicable)
- Selection of the measurement mode: movie, trigger, single shot with customable sampling time and total measurement time

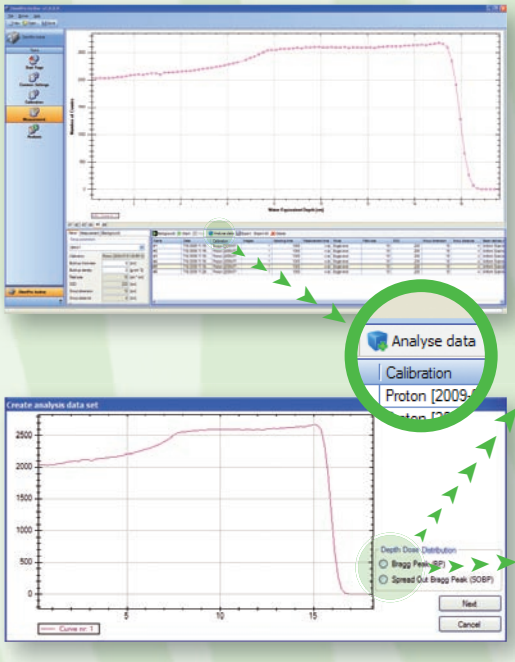
Calibration



- Delivered with uniformity calibration from factory, however, the user can perform recalibration on-site using either Proton or Photon beam
- Intuitive wizard guides through on-site recalibration

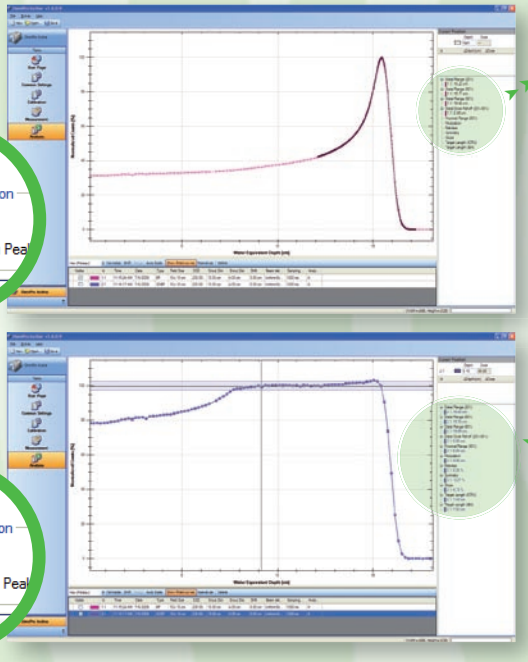
Zebra

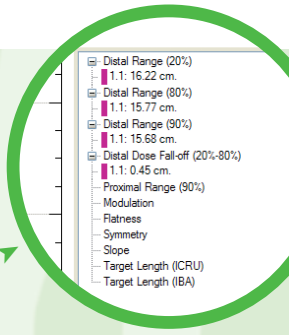
Measurement

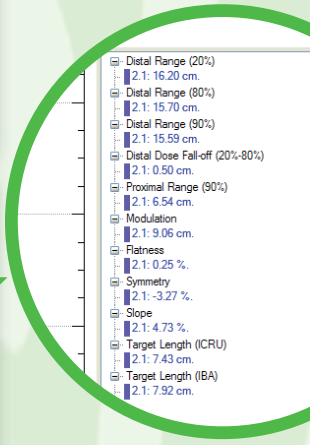


- Possibility to select the set-up of the measurement to be performed
- The measurement container list allows re-selection of previous measurements
- Easy visualization and data manipulation with clear and intuitive icons

Analysis



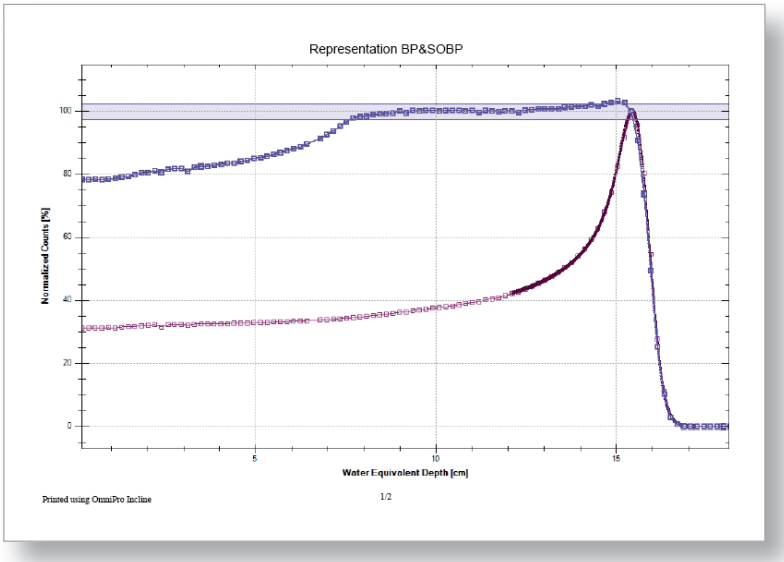




- Dedicated algorithm tool allows for BP or SOBP analysis of the measured data

Reporting tool

Reporting of selected data with their main dosimetry parameters can be printed in few clicks as pdf file.



Representation BP&SOBP

Measurement Information

	Id	Time	Date	Type	Field Size	SSD	Snout Dim.	Snout Dist.	Shift	Beam Delivery Method	Sampling Time
	1.1	11:15:24 AM	7/6/2009	BP	10 x 10 cm	230.00 cm	10.00 cm	4.00 cm	0.00 cm	UniformScanning	1000 ms
	2.1	11:16:17 AM	7/6/2009	SOBP	10 x 10 cm	230.00 cm	10.00 cm	4.00 cm	0.00 cm	UniformScanning	1000 ms

Analysis Information

	Id	Distal Range (20%)	Distal Range (80%)	Distal Range (90%)	DDF (20-80%)	Proximal Range (90%)	Modulation	Flatness	Symmetry	Slope	Target Length (ICRU)	Target Length (IBA)
	1.1	16.22 cm	15.77 cm	15.68 cm	0.45 cm							
	2.1	16.20 cm	15.70 cm	15.59 cm	0.50 cm	6.54 cm	9.06 cm	0.25 %	-3.27 %	4.73 %	7.43 cm	7.92 cm

> At UFPTI, we were very fortunate to have access to a prototype MLIC* during the commissioning of the uniform scanning treatment mode. We found the device to be extremely stable and easy to use, speeding up the process tremendously.
>
> In addition to handling the passive scattering requirements, the MLIC* has the unique ability to perform the commissioning for dynamic beam delivery techniques. We are so confident in the efficiency and reliability of the MLIC* that we plan to establish our future QA procedures around using the MLIC* device from IBA.
>
> **Mr Slopsema (M.S.),**
> **Medical Physicist at the University of Florida,**
> **Proton Therapy Institute**

* working title of Zebra

Technical specifications

Application:	fast measurement of depth dose distribution in particle
Positioning:	nozzle mount (holder optional) or patient table
Range accuracy:	± 0.5 mm
Measuring quantity:	pristine and spread-out bragg peak (SOBP)
Energy range:	33 cm WET
Dose rate range:	0.5 Gy/min to 15 Gy/min
Signal to noise ratio:	better than 0.2 % with 1 cGy integrated dose
Dose linearity:	tested to be better than 0.5 % from 10 cGy up to 5 Gy integral dose and better than 1 % from 0.5 Gy/min up to 15 Gy/min dose rate
Dimensions:	43.9 cm (L) x 19.5 cm (H) x 17.5 cm (W)
Weight:	approx. 10 kg
Power supply:	100-240 V, 50/60 Hz, power cord with US or German power plug included
Interface to PC:	point to point or network Ethernet connection
Collecting electrode:	2.5 cm in diameter
Spatial resolution:	2 mm detector spacing (native resolution)
Chamber type:	vented ionization chambers
Typical sensitivity:	14.76 nC/Gy
Electrometer:	4 TERA ASICs (each contains 64 independent electrometers)
Channels:	180
Charge resolution:	0.1 pC/count
Sampling time:	min. 10 ms
Readout:	parallel and synchronous with no dead time

FDA 510k pending
Patent pending

Technical data is subject to change without prior notice.

IBA activities in a nutshell

IBA delivers solutions of unprecedented precision in the fields of cancer diagnosis and therapy. The company also offers sterilization and ionization solutions to improve the hygiene and safety of everyday life.

Diagnostics
IBA has unique expertise in the design of cyclotrons and in the production and distribution of radiopharmaceutical tracers which are used every day in hospitals to quickly and accurately detect cancer, neurological and cardiac diseases. IBA also offers dosimetry products used in many hospitals for quality assurance in X-Ray diagnosis and for patient-dose monitoring

Therapy
IBA has developed Radiotherapy solutions and dosimetry equipment to treat cancer with the greatest accuracy. IBA is the undisputed leader in Particle Therapy, acknowledged to be the most precise and effective clinical radiotherapy method in the selective destruction of cancer cells.

Sterilization & Ionization
IBA designs electron accelerators and high power X-Ray solutions used in many industries to sterilize medical devices, to cold pasteurize food products and to improve polymer properties. Over 250 IBA Industrial accelerators are used in the world today, some for more than 40 years.

IBA a Belgian company, is listed on the paneuropean stock exchange EURONEXT and its Annual Reports can be downloaded on the Website: www.iba-group.com.

Manufacturer:

Germany
IBA Dosimetry GmbH
Bahnhofstr. 5
90592 Schwarzenbruck
Tel.: +49 9128 607 0
Fax: +49 9128 607 10

USA
IBA Dosimetry America
3150 Stage Post Drive, Suite 110
Bartlett, TN 38133
Tel.: +1 901 386 2242
Fax: +1 901 382 9453

Sweden
IBA Dosimetry AB
P.O. Box 1004
751 40 Uppsala
Tel.: +46 18 18 07 00
Fax: +46 18 12 75 52

China
IBA Dosimetry China
No.6, Xing Guang Er Jie Beijing
OPTO-mechatronics
Industrial Park (OIP),
Tongzhou District
Beijing 101111
Tel.: +86 10 8080 9288
Fax: +86 10 8080 9299

CE

www.iba-dosimetry.com
info@iba-dosimetry.com