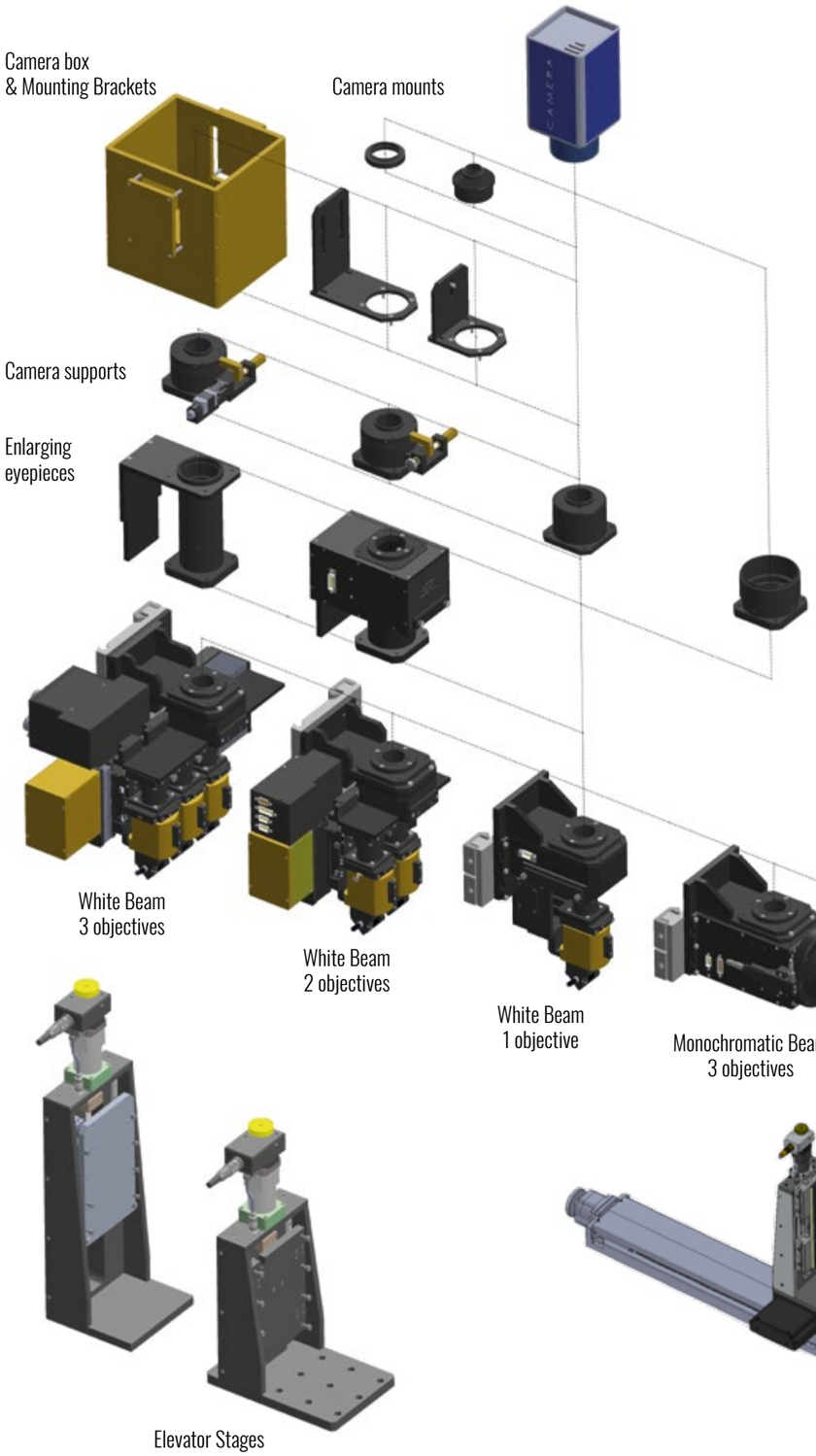
Optique Peter

OPTICAL & MECHANICAL ENGINEERING

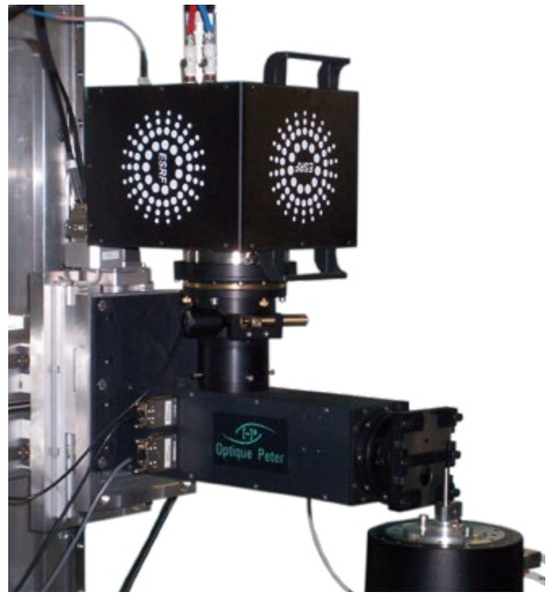
X-RAY IMAGING AND OPTICAL EQUIPMENTS FOR SYNCHROTRONS

High Resolution X-Ray Imaging Microscopes
Modular System



High Resolution X-Ray Imaging Microscopes
Monochromatic Beam Configuration
(Low/medium X-Ray flux& energy)

Vertical configuration – 3 objectives – 3 scintillators
Four enlarging eyepieces for large camera detectors



Horizontal configuration – 3 objectives
Enlarging eyepiece for large camera detectors

3 objectives – 3 scintillator supports

Single objective

High resolution X-Ray imaging microscopes
Monochromatic beam configuration (Low/medium X-Ray flux & energy)

Triple objective motorized nosepiece

MICROSCOPE

- 3 objectives on a motorised nosepiece
- Motorised Focus
- Manual or motorised camera rotation
- Single or triple motorized scintillator supports
- Adapters for different camera formats & interfaces

LIGHT TIGHT SCINTILLATOR SUPPORTS

- Standard or specific supports
- Tiltable scintillator support
- Multiple motorised scintillator support

Triple motorized scintillator support
Taper mounts, tiltable

Triple motorized scintillator support
Spring mounts, non tiltable

Single scintillator support
Taper mounts, non tiltable

Single spring scintillator mount, tiltable

Single spring scintillator mount, non tiltable

Single taper scintillator mount, tiltable

Manual camera rotation

Motorized camera rotation

No camera rotation

High resolution X-Ray imaging microscopes
White Beam configuration (High X-Ray flux & energy)

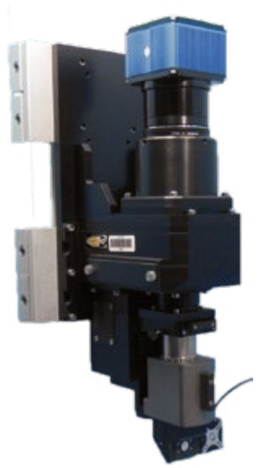
Double objective WB microscope

WHITE BEAM MICROSCOPES

- 2X-5X-7.5X-10X-20X long working distance objectives
- Single, double or triple objective configurations
- Single or multiple eyepieces supports for large format cameras
- Individual radiation shield around each objective
- Low backscattering

Triple objective WB microscope

WB Microscope with single or multiple eyepieces supports



Combined imaging & diffraction

TILTABLE SCINTILLATOR SUPPORTS

- Spring mounting system for easy scintillator removal for cleaning
- Tilt system for fine adjustment of the scintillator in the object plane of the objective

Special Radiation
Hardened Objectives

Objective	2 X	5 X	HR 5X	7,5 X	10 X	20 X
Front Shield Thickness (mm)	4,0	4,0	3,0	4,5	4,5	3,0
NA	0,055	0,14	0,21	0,21	0,28	0,42
Resolution Limit (µm) - (@ 550nm)	6,1	2,4	1,6	1,6	1,2	0,80
FROND RADIATION RESISTANT GLASS SHIELD EFFICIENCY (X-RAY ABSOPTION)						
X-Ray energy						
<= 30 KeV	100 %		100 %	100 %		100 %
40 KeV	99,8 %		99 %	99,9 %		99 %
50 KeV	98 %		94 %	98,5 %		94 %
60 KeV	91 %		83,4 %	93 %		83 %
70 KeV	81 %		71 %	84 %		71 %
80 KeV	70 %		59,8 %	74 %		60 %
88 KeV	96 %		91,4 %	97 %		91 %
100 KeV	91 %		83,4 %	93 %		83 %
120 KeV	79 %		68,8 %	83 %		69 %
150 KeV	61 %		50,5 %	65 %		50 %

Special White Beam X-Ray imaging dedicated long working distance objectives
With Radiation Hardened & X-Ray absorbing front shield

Optical data
for Monochromatic Beam Microscopes

Objective	1,25 X	2 X	4 X	10 X	10 X	20 X	20 X (Lwd)	20 X (Lwd)	40 X	40 X (Lwd)
Glass thickness comp. (mm)	-	-	-	-	0,17	0,17	0 - 2	0 - 1,6	0,11 - 0,23	0 - 2
NA	0,04	0,08	0,16	0,30	0,40	0,75	0,45	0,70	0,95	0,60
Working distance (mm)	5,00	6,20	13,0	10,00	3,10	0,60	6,6 - 7,8	0,8 - 1,8	0,18	2,7 - 4
Résolution limit (µm) - (@ 550nm)	8,4	4,2	2,1	1,12	0,84	0,45	0,75	0,48	0,35	0,56
sCMOS Andor Zyla 4.2 - PCO Edge 4.2 - Hamamatsu Orca Flash 4.0 (2048x2048 pixels 6.5x6.5µm - Detector diagonal= 18.826mm)										
Hor. Object field (mm)	10,65	6,66	3,33	1,33	1,33	0,67	0,67	0,67	0,33	0,33
Vert. Object field (mm)	10,65	6,66	3,33	1,33	1,33	0,67	0,67	0,67	0,33	0,33
Object H&V pixel size (µm)	5,2	3,3	1,6	0,65	0,65	0,33	0,33	0,33	0,16	0,16
+/- Depth of focus (µm) - (@550nm)	237	63	16	4,1	2,5	0,71	1,72	0,79	0,39	0,9
sCMOS PCO Edge 5.5 - Andor Neo 5.5 & Zyla 5.5 (2560x2160 pixels 6.5x6.5µm - Detector diagonal= 21.772mm)										
Hor. Object field (mm)	13,31	8,32	4,16	1,66	1,66	0,83	0,83	0,83	0,42	0,42
Vert. Object field (mm)	11,23	7,02	3,51	1,40	1,40	0,70	0,70	0,70	0,35	0,35
Object H&V pixel size (µm)	5,2	3,3	1,6	0,65	0,65	0,33	0,33	0,33	0,16	0,16
+/- Depth of focus (µm) - (@550nm)	237	63	16	4,1	2,5	0,71	1,72	0,79	0,39	0,9
CCD Frelon (Atmel TH7899M) with 2.5X eyepiece (2048x2048 pixels 14x14µm - Detector diagonal= 40.548mm)										
Hor. Object field (mm)	9,18	5,73	2,87	1,15	1,15	0,57	0,57	0,57	0,29	0,29
Vert. Object field (mm)	9,18	5,73	2,87	1,15	1,15	0,57	0,57	0,57	0,29	0,29
Object H&V pixel size (µm)	4,48	2,80	1,40	0,56	0,56	0,28	0,28	0,28	0,14	0,14
+/- Depth of focus (µm) - (@550nm)	228	60	15	4,0	2,4	0,68	1,67	0,76	0,38	0,9

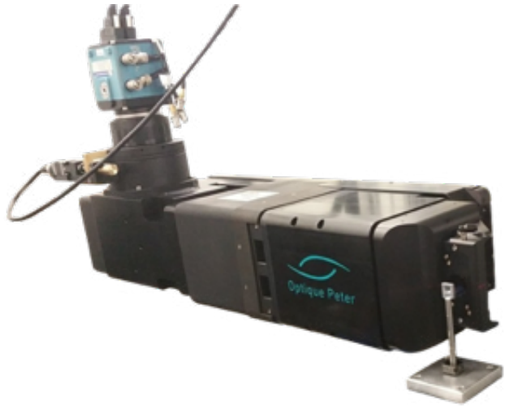
Optical data
for White Beam Microscopes

Objective	2 X (Lwd)	5 X (Lwd)	HR 5X (Lwd)	7,5 X (Lwd)	10 X (Lwd)	20 X (Lwd)
Front shield thickness	4,0	4,0	3,0	4,5	4,5	3,0
NA	0,055	0,14	0,21	0,21	0,28	0,42
Working distance (mm)	29,5	29,5	20,4	26,9	26,9	15,2
Résolution limit (µm) - (@ 550nm)	6,1	2,4	1,6	1,6	1,2	0,80
sCMOS Andor Zyla 4.2 - PCO Edge 4.2 - Hamamatsu Orca Flash 4.0 (2048x2048 pixels 6.5x6.5µm - Detector diagonal= 18.826mm)						
Hor. Object field (mm)	7,40	2,96	2,96	1,97	1,48	0,74
Vert. Object field (mm)	7,40	2,96	2,96	1,97	1,48	0,74
Object H&V pixel size (µm)	3,61	1,44	1,44	0,96	0,72	0,36
+/- Depth of focus (µm) - (@550nm)	124	19	10	8,5	4,8	2,0
sCMOS PCO Edge 5.5 (2560x2160 pixels 6.5x6.5µm - Detector diagonal= 21.772mm)						
Hor. Object field (mm)	9,24	3,70	3,70	2,47	1,85	0,92
Vert. Object field (mm)	7,80	3,12	3,12	2,08	1,56	0,78
Object H&V pixel size (µm)	3,61	1,44	1,44	0,96	0,72	0,36
+/- Depth of focus (µm) - (@550nm)	124	19	10	8,5	4,8	2,0
CMOS PCO Dimax S4 - with 2X eyepiece (2016x2016 pixels 11x11µm - Detector diagonal= 31.362mm)						
Hor. Object field (mm)	6,16	2,46	2,46	1,64	1,23	0,62
Vert. Object field (mm)	6,16	2,46	2,46	1,64	1,23	0,62
Object H&V pixel size (µm)	3,06	1,22	1,22	0,81	0,61	0,31
+/- Depth of focus (µm) - (@550nm)	119	18	18	8,2	4,6	1,9

Low magnification
X-Ray Imaging Macroscopes

VERY HIGH RESOLUTION 4X/0.35 MACROSCOPE

- For large detectors up to 44 mm diagonal
- Aberration free and resolution limited image on 11 mm field of view
- Modular configuration for vertical or horizontal setups
- Motorized focus – Camera rotation – Aperture iris diaphragm



1X Macroscope
For large format cameras
Up to 42 mm field of view
Motorised focus

Zoom macroscope
18 mm to 3 mm field of view
Motorised focus & diaphragm
Detector up to 44mm

Zoom macroscope
18 mm to 3 mm field of view
Quadruple motorized scintillator support
Motorised quadruple scintillator support

Low Magnification
Macro Objectives

High NA 5X macro objective

High resolution 4X/0.35 Tandem macro optics

High NA 4X/0.20 macro objective

Tandem macro objectives

Mirror Objective
for High Energy Beams Imaging

Beam stop interface

10X/0,4 MIRROR OBJECTIVE

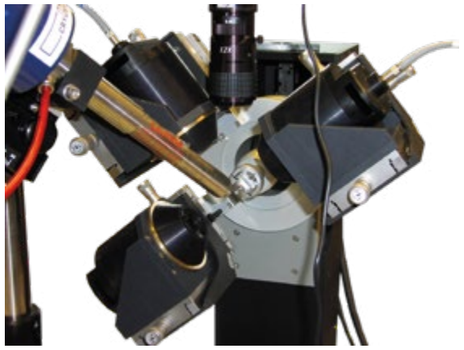
- High resolution on axis optic
- 43 mm long working distance
- Object field up to 2 mm diameter
- Sensor up to 20 mm diagonal
- Beam stop interface on front mirror
- Internal lead shield protection

T Mount adapter
(Suitable for F-Mount and C-mount cameras)

Spectroscopy

MICRO SPECTRO PHOTOMETER

- 3 * 90°- orientated objectives supports
- 3 axis adjustable support
- Long working distance objectives
- Polarizer on objectives
- Filter slider on objectives
- Long working distance video microscope
- XY stages
- 2 axis-motorised sample holder
- Motorised rotation
- Goniometric head interface



Mirror objectives
for Wide Spectrum Spectroscopy

Objectives with optic fibres matig sleeves — rotatable polariser/analyser — filters

4X/0.29 objective
50 mm working distance

4X/0.22 objective
35.5 mm working distance

Video Microscopes
Applications

Motorised video microscope
Multiple objective nospiece
Integrated slip ring connector
(Sensor mounting on objective attachment)

Vacuum operation
Long working distance optics

Drilled bending mirrors
(for X-Ray beam path)

References

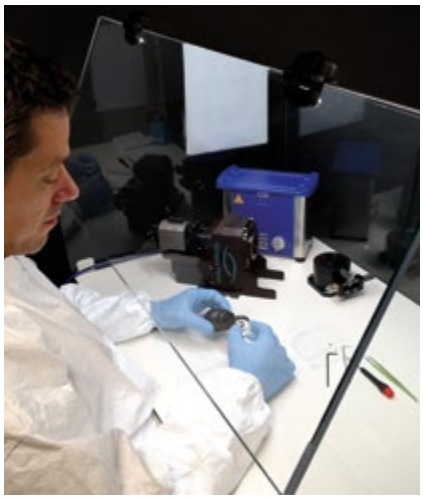
Other activities

NUCLEAR

MICRO-ELECTRONICS

SPECTROSCOPY

OPTICAL COMPONENTS



MAINTENANCE

SPECIAL MICROSCOPES

Design by artenium - 07/2019

Our fields of activity

ENGINEERING

- Nuclear Hot Laboratories
- Nuclear Glove Boxes
- X-Ray and Neutron Imaging
- Microscopy - Spectroscopy
- Research - Medical - Vision
- Instrumentation - Measurement

SERVICES

- On-site maintenance
- Workshop repair
- Calibration
- Equipment modification
- Training Sessions

Contact

Optique Peter

Allée Romaine — ZA du Charpenay — 69210 Lentilly
+33 (0)4 78 47 78 74
info@optiquepeter.com
www.optiquepeter.com