

Cinel Strumenti Scientifici was founded in Padua in the 70's with a technical partnership of INFN LNL Legnaro Laboratory on particle accelerator projects and since then has been involved in some of the most challenging projects all over Europe.

Nowadays, CINEL has reached a long experience on mechanical design and manufacture of apparatuses in several scientific and research fields such as Synchrotron Light Sources (monochromators, fully integrated front ends and beam lines, experimental chambers), as well as accelerator components (vacuum chambers, accelerating cavities, radiofrequency quadrupole cavities) and accessories for analytical instruments such as laboratory gas generators.

Cinel has acquired skilled experience in the field of cryogenics, superconductivity, astrophysics and bio-mechanics collaborating with well-known institutions as a qualified partner in the mechanical, thermal and control system design and it can now propose turnkey solutions with high level standardization.

CAD-CAM environment and CNC machines allow Cinel to fully develop whole technical projects, from the design phase to the product certification taking care of all the electro-mechanical, pneumatic and hydraulic aspects.

Cinel in an ISO 9001 qualified company.

The first premises, the head quarter of the company, is 2000 m². It is arranged in order to separate the workshop area from the welding and from the mounting and testing areas. It is now operative a second premises of 500 m² for final assembly and testing. Both premises are based in Vigonza (Pd) Italy.



Azienda con sistema di qualità certificato ISO 9001:2008

ITALIAN PATENT
 Number 0001397254

EUROPEAN PATENT
 Application Number EP10814714.1

NITROGEN GENERATORS **N₂**

HYDROGEN GENERATORS **H₂**

OXYGEN GENERATORS **O₂**

ZERO AIR GENERATORS **Z** ZERO AIR

Marzo 2016

DESIGN AND PRODUCTION
 OF LABORATORY
 GAS GENERATORS



ZEFIRO series
 NITROGEN GENERATORS

“Design and production
 of laboratory
 gas generators”

The constant and completely
 autonomous supply of nitrogen flux





ZEFIRO LC/MS 20-25-35-40 PSA technology

ZEFIRO Nitrogen Generator is designed specifically as a stand-alone system to provide nitrogen to single LC/MS applications which require a constant and autonomous supply of nitrogen flux.

The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas. This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and water vapor molecules under high pressure, while allowing Nitrogen to pass through. The alternation between purification and regeneration of the sieve bed pressure Vessels ensure continuous nitrogen flow production.

Application

LC/MS

Technical data

	ZEFIRO LC/MS 20-25		ZEFIRO LC/MS 35-40	
STANDARD NITROGEN FLOW RATE	20 l/min at STP	25 l/min at STP	35 l/min at STP	40 l/min at STP
OUTLET PRESSURE	up to 8 bar (116 psi)		up to 8 bar (116 psi)	
STANDARD PURITY	99,0% at STP		99,0% at STP	98,5% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz		110 V / 60 Hz - 230 V / 50 Hz	
WEIGHT	120 Kg		120 Kg	
POWER CONSUMPTION	1800 W		1800 W	
FUSE	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F		N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	
PRESSURE ACCURACY	0.1 bar (± 0.5 %)		0.1 bar (± 0.5 %)	
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px		Graphic display, 128 x 64 px	
INDEX OF PROTECTION	IP2x		IP2x	
TEMPERATURE	5°C to +30°C		5°C to +30°C	
RELATIVE HUMIDITY	0-80%, non condensing		0-80%, non condensing	
SOUND PRESSURE LEVEL	50 dB(A)		50 dB(A)	
OUTPUT PORT	G1/4		G1/4	
CASE DIMENSIONS	width 48 cm, height 70 cm, length 84 cm		width 48 cm, height 70 cm, length 84 cm	

STP: Standard Temperature and Pressure (20°C, 1 bar)

ZEFIRO LC/MS 60 PSA technology

ZEFIRO Nitrogen Generator is designed specifically as a stand-alone system to provide nitrogen flux to single LC/MS applications which require a high nitrogen consumption or allows two standard LC/MS to be supplied contemporaneously.

The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas. This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and water vapor molecules under high pressure, while allowing Nitrogen to pass through. The alternation between purification and regeneration of the sieve bed pressure Vessels ensure continuous nitrogen flow production.

Application

LC/MS

Technical data

	ZEFIRO LC/MS 60
STANDARD NITROGEN FLOW RATE	60 l/min at STP
OUTLET PRESSURE	up to 7.5 bar (109 psi)
STANDARD PURITY	98,0% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	130 Kg
POWER CONSUMPTION	1900 W
FUSE	N.1 6.3x32 mm, 16 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	5°C to +30°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	55 dB(A)
OUTPUT PORT	G1/4
CASE DIMENSIONS	width 48 cm, height 70 cm, length 84 cm



ZEFIRO LC/MS COMBINED

ZEFIRO Nitrogen Generator LC/MS COMBINED is specifically designed to supply Nitrogen & Exhaust gases for all the AB SCIEX LC/MS instruments. The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas. This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and residual water vapor molecules under high pressure, while allowing Nitrogen to pass through. The internal oil free air compressor which is firstly pre filtered provide also to the exhaust air flow which is treated by a drying filter.

Application

**AB SCIEX
LC/MS**

Technical data

STANDARD AIR & NITROGEN FLOW RATE	Air outlet: up to 40 l/min at STP N2 outlet: up to 15 l/min at STP
OUTLET PRESSURE AIR & NITROGEN	Max 7,0 bar (100 psi) Max 5,0 bar (70 psi)
STANDARD PURITY	99.0% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	120 Kg
POWER CONSUMPTION	1800 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	5°C to +30°C
RELATIVE HUMIDITY	0-60%, non condensing
SOUND PRESSURE LEVEL	50 dB(A)
OUTPUT PORT	G1/4
CASE DIMENSIONS	width 48 cm, height 70 cm, length 84 cm

ZEFIRO LC/MS DUAL-PURITY

ZEFIRO Nitrogen Generator LC/MS DUAL PURITY is specifically designed to meet the gas flow, purity and pressure requirements of AGILENT LCMS instruments. The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas. This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and water vapor molecules under high pressure, while allowing Nitrogen to pass through. The system supplies simultaneously Nitrogen for LC/MS & ultra high purity nitrogen for the collision cell combining standard PSA management with special PSA DP (Double Step) to produce pure nitrogen gas with ultra high purity.

Application

**AGILENT
LC/MS**

Technical data

STANDARD NITROGEN FLOW RATE	First N2 outlet: up to 40 l/min to at STP Second N2 outlet: up to 200 ml at STP
OUTLET PRESSURE	8 Bar at STP 2 Bar at STP
STANDARD PURITY	99.0% at STP 99,999% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	130 Kg
POWER CONSUMPTION	1800 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	5°C to +30°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	50 dB(A)
OUTPUT PORT	G1/4
CASE DIMENSIONS	width 48 cm, height 70 cm, length 84 cm



ZEFIRO LC/MS COMBINED S

ZEFIRO Nitrogen Generator LC/MS COMBINED S is specifically designed to supply Nitrogen & Exhaust gases for the SHIMADZU LC/MS 8050.

The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas at specific purity required.

This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and residual water vapor molecules under high pressure, while allowing Nitrogen to pass through. The internal oil free air compressor which is firstly pre filtered provide also to the exhaust air flows which are treated by a drying filter.

Application

**Shimadzu LC/MS
8050**

Technical data

NITROGEN FLOW RATE @ MAX PRESSURE MOD 8050 DRY AIR FLOW RATE @ MAX PRESSURE	30 l/min at STP @ > 7.0 bars (100 psi) purity > 98,0% 25 l/min at STP @ > 7.0 bars (100 psi)
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	130 Kg
POWER CONSUMPTION	1900 W
FUSE	N.1 6.3x32 mm, 16 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
OPERATING CONDITIONS: - TEMPERATURE - RELATIVE HUMIDITY	5°C to +30°C 0-80%, non condensing
OVER VOLTAGE CATEGORY	II
POLLUTION DEGREE	2
SOUND PRESSURE LEVEL	<55 dB(A)
OUTPUT PORT	N. 02 G 1/4
CASE DIMENSIONS	width 48 cm, height 70 cm, length 84 cm

STP: Standard Temperature and Pressure (20°C, 1 bar)

ZEFIRO MP

ZEFIRO Nitrogen Generator "MP" series is specifically designed to supply Nitrogen & Exhaust Air for the AGILENT 4200 MP-AES.

The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas at specific purity required > 99,5%.

This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and residual water vapor molecules under high pressure, while allowing Nitrogen to pass through. The internal oil free air compressor which is firstly pre filtered provide also to the exhaust air flow which is treated by a drying filter.

Application

**AGILENT
4200 MP-AES**

Technical data

NITROGEN FLOW RATE @ MAX PRESSURE	25 l/min at STP @ 5.5 bars (80 psi) at > 99,5% purity
DRY AIR (ZERO AIR) FLOW RATE @ MAX PRESSURE	26,5 l/min at STP Dew Point 0°C @ 5.5 bars (80 psi)
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	130 Kg
POWER CONSUMPTION	1900 W
FUSE	N.1 6.3x32 mm, 16 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	5°C to +30°C
RELATIVE HUMIDITY	0-80%, non condensing
OVER VOLTAGE CATEGORY	II
SOUND PRESSURE LEVEL	<55 dB(A)
OUTPUT PORT	N. 02 G 1/4
CASE DIMENSIONS	width 48 cm, height 70 cm, length 84 cm



ZEFIRO HIGH PRESSURE

The HIGH PRESSURE nitrogen generator has been specifically designed to meet the gas flows, purity and pressure requirements of the Accelerated Solvent Extraction System (ASE®), the Dionex patented technique for the extraction of solid and semisolid sample matrices using common solvents at elevated temperatures and pressures. The Nitrogen reach the maximum pressure of 11 bars.

Application

DIONEX ASE
Sample Preparation

Technical data

STANDARD NITROGEN FLOW RATE	Up to 40 l/min at STP
OUTLET PRESSURE	Up to 11 bar (160 psi)
STANDARD PURITY	99,0% at STP (in function of the outlet flow)
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	120 Kg
POWER CONSUMPTION	1800 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	5°C to +30°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	50 dB(A)
OUTPUT PORT	G1/4
CASE DIMENSIONS	width 48 cm, height 70 cm, length 84 cm

STP: Standard Temperature and Pressure (20°C, 1 bar)

ZEFIRO 8 EL/SD

ZEFIRO Nitrogen Generator EL/SD series is specifically designed to meet the gas flow, purity and pressure requirements of Evaporative Light Scattering Detectors. The Nitrogen generator uses pressure swing adsorption technology (PSA) to produce nitrogen gas.

This system uses carbon molecular sieve (CMS) which selectively adsorbs oxygen and water vapor molecules under high pressure, while allowing Nitrogen to pass through.

Application

EL/SD

Technical data

STANDARD NITROGEN FLOW RATE	8 l/min at STP
OUTLET PRESSURE	5 bar at STP (72,5 psi)
STANDARD PURITY	99,9% at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	110 Kg
POWER CONSUMPTION	800 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	5°C to +30°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	50 dB(A)
OUTPUT PORT	G1/4
CASE DIMENSIONS	width 48 cm, height 70 cm, length 84 cm



ZEFIRO HP series



ZEFIRO 3 HP - 5 HP & mini-ZEFIRO 1 HP

The model HP (High Purity) Nitrogen Generator is designed specifically for use as make up and carrier gas for GC Applications, which require ultra high purity nitrogen for operation.

The HP nitrogen generator series is also suitable for ICP.

The Nitrogen generator use pressure swing adsorption technology (PSA) combined with a pressure management in two steps (DP PSA) to produce pure nitrogen gas with ultra high purity.

Application

Carrier gas for GC
ICP

Technical data

	ZEFIRO 3 HP	ZEFIRO 5 HP
STANDARD NITROGEN FLOW RATE	3 l/min at STP	5 l/min at STP
OUTLET PRESSURE	max 5 bar (87 psi)	max 5 bar (87 psi)
STANDARD PURITY	99.999% (O ₂ < 10 ppm) at STP	99.999% (O ₂ < 10 ppm) at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	95 Kg	110 Kg
POWER CONSUMPTION	800 W	1500 W
FUSE	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F	N.1 6.3x32 mm, 20 A, type F N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x	IP2x
TEMPERATURE	5°C to +30°C	5°C to +30°C
RELATIVE HUMIDITY	0-80%, non condensing	0-80%, non condensing
SOUND PRESSURE LEVEL	50 dB(A)	50 dB(A)
STANDARD OUTPUT PORT	Swagelok 1/8"	Swagelok 1/8"
CASE DIMENSIONS	width 48 cm, height 64 cm, length 84 cm	width 48 cm, height 64 cm, length 84 cm

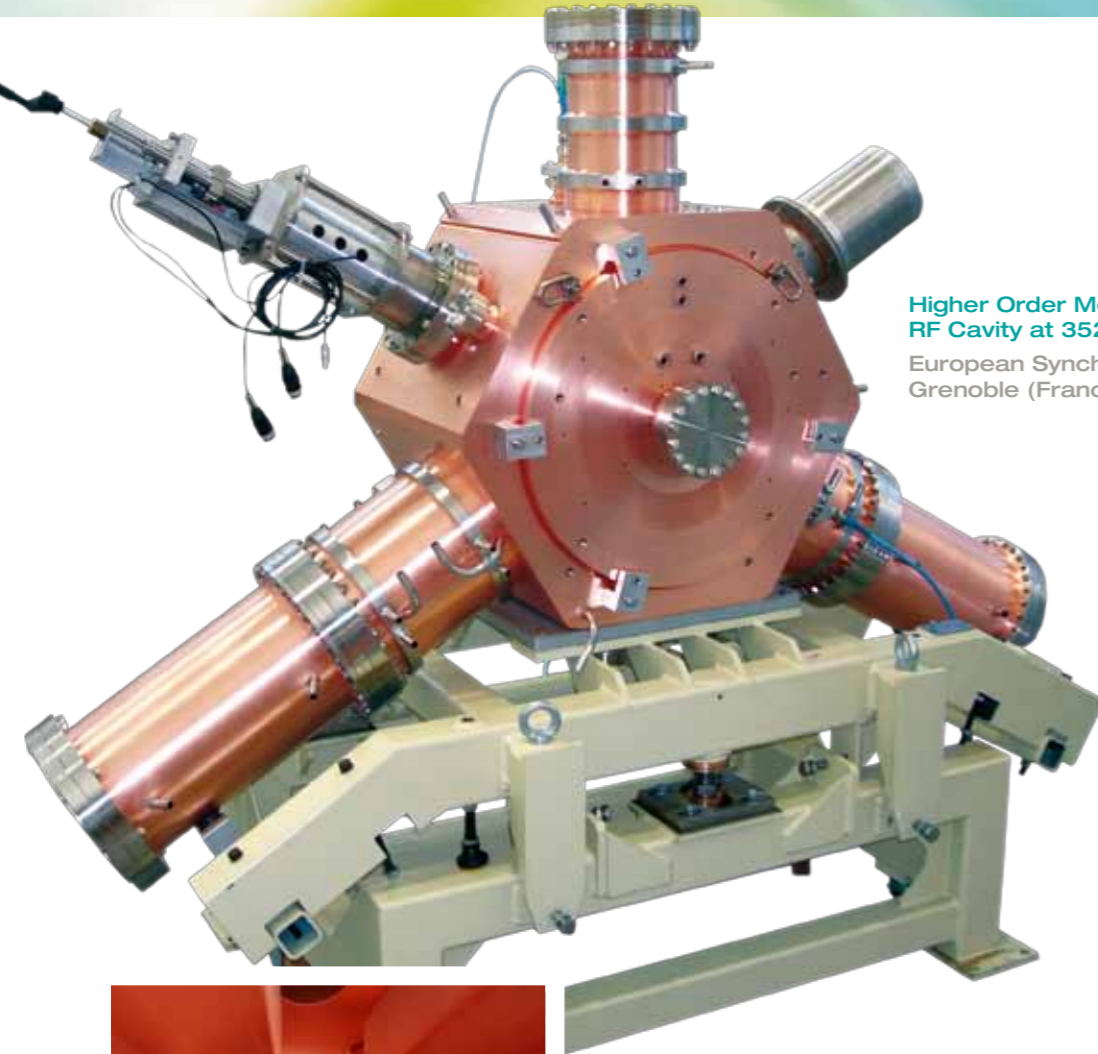
STP: Standard Temperature and Pressure (20°C, 1 bar)

Technical data

	mini-ZEFIRO 1 HP
STANDARD NITROGEN FLOW RATE	1 l/min at STP
OUTLET PRESSURE	max 5 bar (87 psi)
STANDARD PURITY	99.999% (O ₂ < 10 ppm) at STP
INPUT VOLTAGE	110 V / 60 Hz - 230 V / 50 Hz
WEIGHT	45 Kg
POWER CONSUMPTION	600 W
FUSE	N.1 6.3x32 mm, 20 A, type F - N.2 5x20 mm, 10 A, type F
PRESSURE ACCURACY	0.1 bar (± 0.5 %)
MICROPROCESSOR CONTROLLED DISPLAY	Graphic display, 128 x 64 px
INDEX OF PROTECTION	IP2x
TEMPERATURE	5°C to +30°C
RELATIVE HUMIDITY	0-80%, non condensing
SOUND PRESSURE LEVEL	50 dB(A)
STANDARD OUTPUT PORT	Swagelok 1/8"
CASE DIMENSIONS	width 55 cm, height 42 cm, length 51 cm

Components for PARTICLE ACCELERATORS

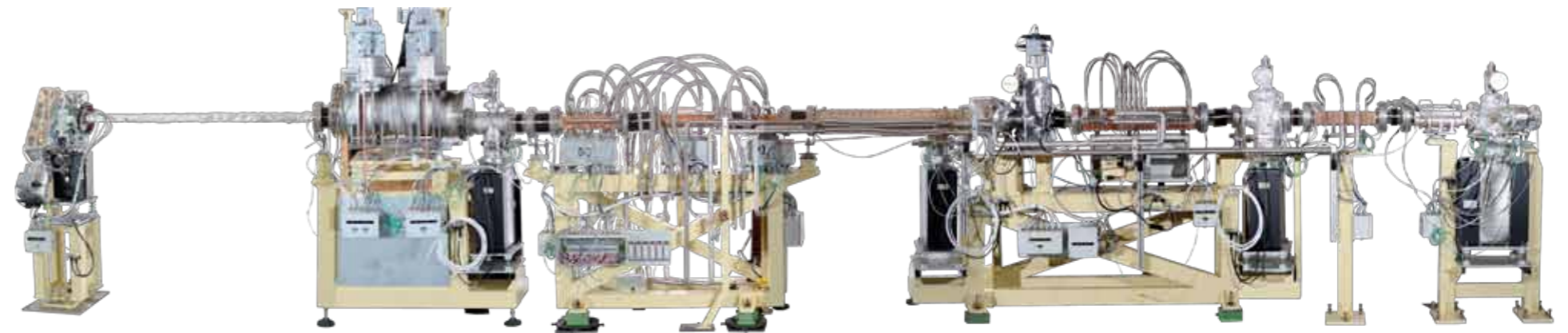
SYNCHROTRON LIGHT



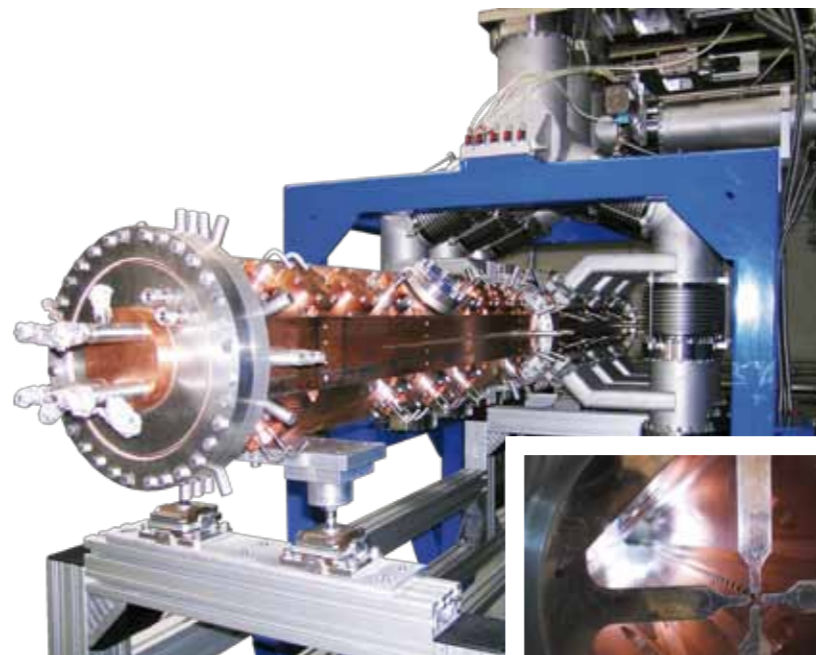
Higher Order Mode Damped Single Cell
RF Cavity at 352.2 MHz
European Synchrotron Radiation Facility - ESRF
Grenoble (France)



Fixed exit double channel DCM
Monochromator (2.5÷100 keV)
for ID06 Beamline
European Synchrotron Radiation Facility - ESRF
Grenoble (France)



120 Canted Wiggler Front-end
Diamond Light Source Didcot (UK)



Radio Frequency Quadrupole
Linac Injector for High Intensity
Proton Beam Linac (352.2 Mhz)
Italian Institute for Nuclear Physics
Legnaro (Italy)



Mirror Chamber for Protein
Crystallography Beamline (M1)
X06DA Swiss Light Source - SLS
Villigen (Switzerland)

