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宏碩系統股份有限公司

Wave Power Technology Inc.

Investor Conference, Dec. 2023

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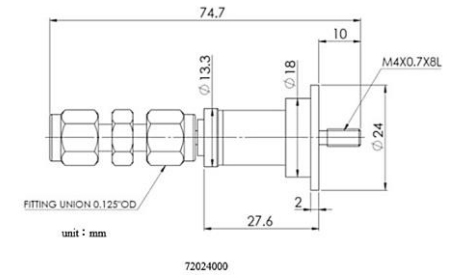
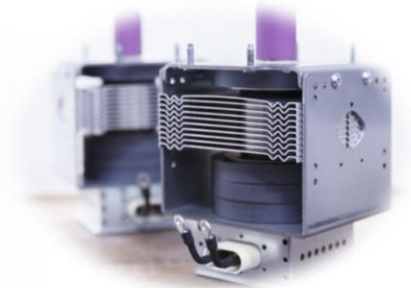
AGENDA

- 1、Company overview
- 2、Operational Performance
- 3、Market Outlook
- 4、Financial Information
- 5、Future Outlook

1、Company overview

Basic Information

Company Name	WAVE POWER TECHNOLOGY INC.
Capital	NTD 341,000,000
Chairman & CEO	Dr. CH Chao
General Manager	Dr. Bob Chen
Establishment	December, 2002
Number of employee	92 persons
Main business	Microwave tubes and spare parts for semiconductor process tools



2、Operational Performance

Industrial coverage of 4H related products

Defense microwave tube

TWT, Magnetron

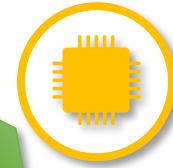


Commercial microwave tube

Magnetron



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Spare parts of semiconductor tools

(feedthrough、brazing、heater、magnet assembly)

Others

(microwave system、storage ring of accelerator)

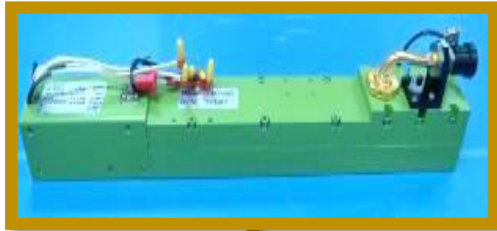
Applications of 4H related products

4H technology Product	High power	High frequency	High vacuum	High voltage
Regime of core technology	1kW – 10's kW	1GHz – 10's GHz	10 ⁻¹⁰ torr	1kV – 10's kV
Microwave tube	⊙	⊙	⊙	⊙
Hermetic sealing			⊙	⊙
Microwave system	⊙	⊙	⊙	⊙

Typical experience	Mobile device	Home appliance	Typical plasma	Home appliance
	10 ⁻³ W - 1 's W	50Hz/60Hz	10 ⁻¹ torr - 760 torr	110V/220V

Applications of microwave tube in defense industry

Radar



Traveling-wave tube



Radar

Aircraft



Defensive aircraft

Transponder



Magnetron

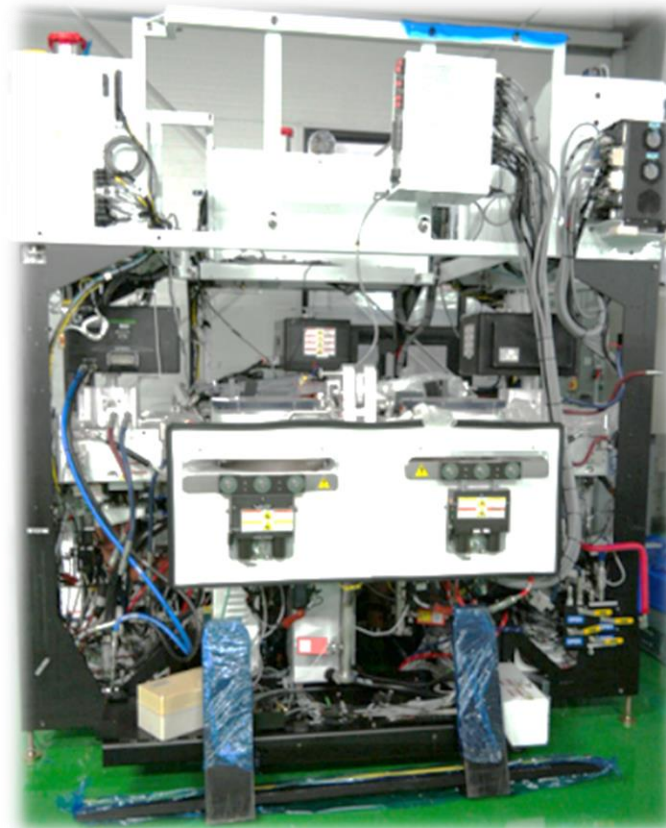


Defensive frigate

Applications of microwave tube in semiconductor industry



magnetron



Used in UV-curing process tool of AMAT Producer

Applications of spare parts in semiconductor industry(I)



Feedthrough



Used in E-beam system of E-Scan inspection tool



Spare parts made by brazing between heterogeneous materials and widely used in process tools of semiconductor industry

Applications of spare parts in semiconductor industry(II)



heater



Used in CVD process tool of Novellus C2 Sequel



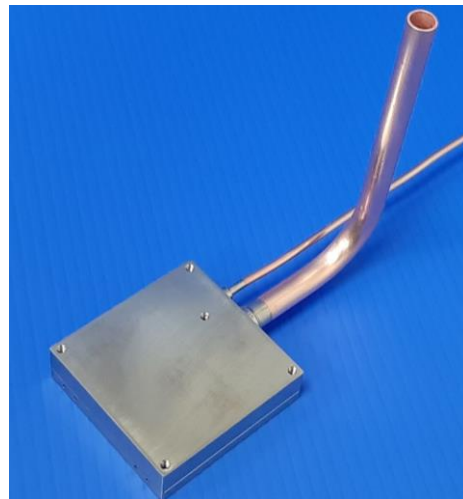
Magnet assembly



Used in PVD process tool of AMAT Endura HP PVD

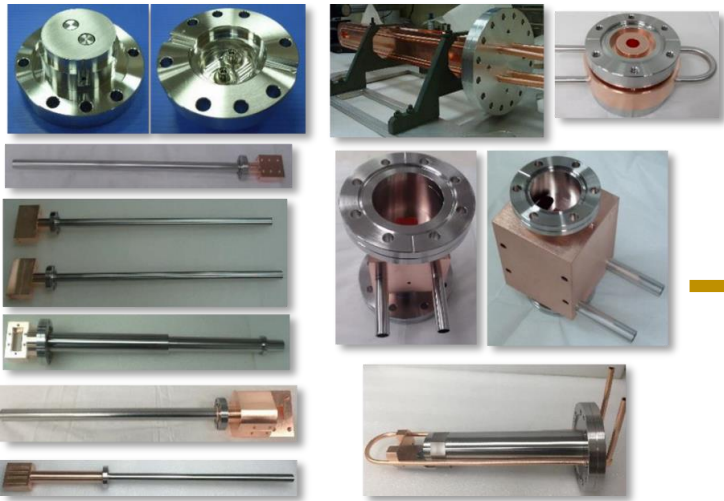
Applications of spare parts in semiconductor industry(Ⅲ)

Evaporator



Logic testers of AI chips

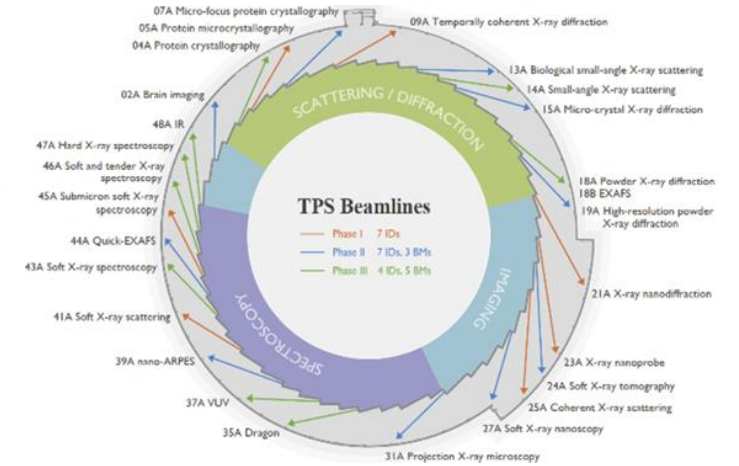
Applications of other products in scientific instrument



Assemblies made by brazing between heterogeneous materials



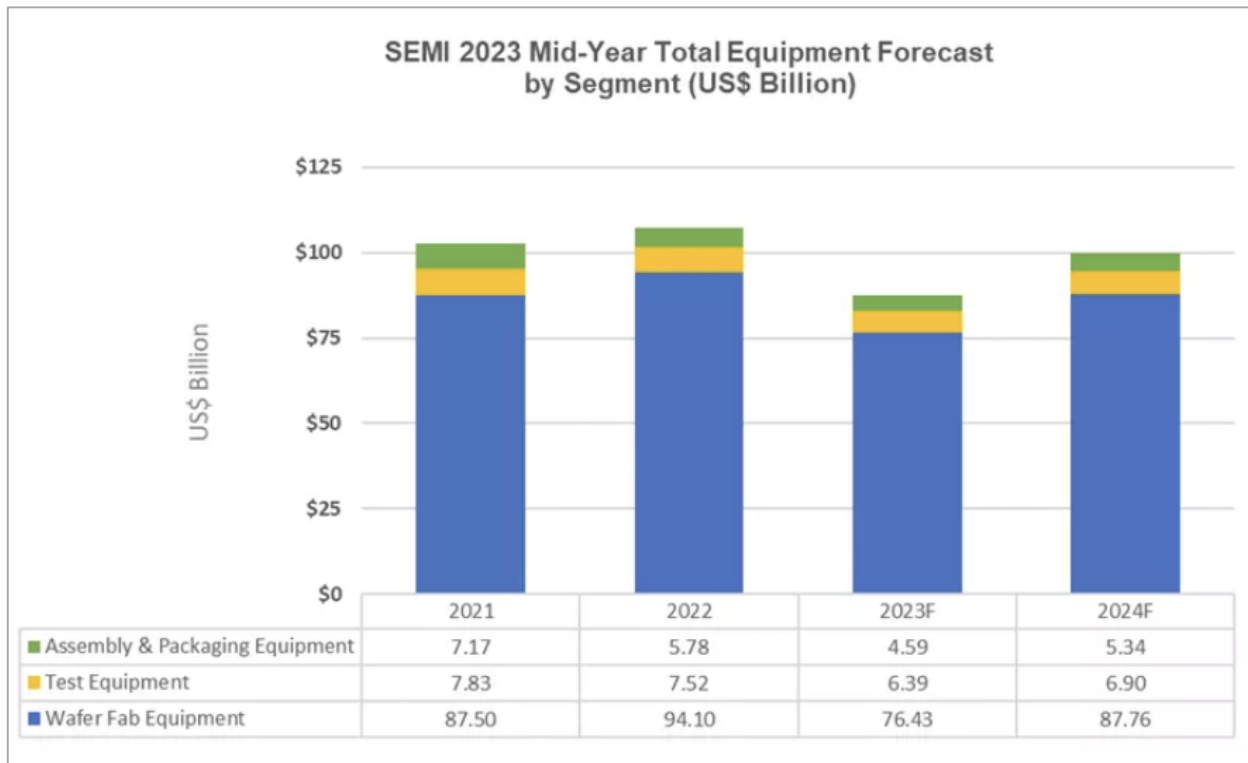
Used in the storage ring of accelerator



3、Market Outlook

Semiconductor Industry

Despite the cyclic slowdown of semiconductor industry in 2023, global semiconductor industry is expected to recover in 2024.

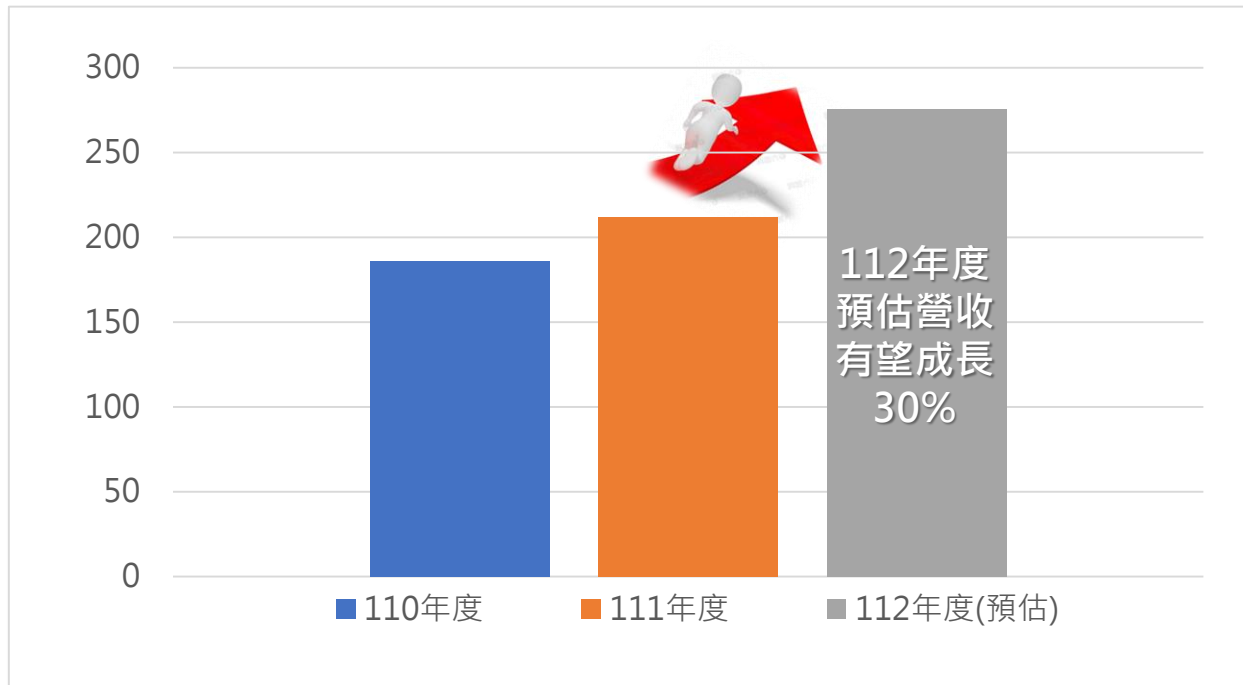


Source of information : SEMI

Semiconductor Industry

Information disclosed in the investor conference of ASML in Oct. 2023

Revenue of ASML 2021~2023



- Revenue of ASML 2023 is expected to grow by 30% as compared to 2022. But revenue of 2024 is forecast to be close to 2023 in a conservative way considering uncertainties associated with recovery prospect.
- ASML will invest NT 30 B in Taiwan to build up a mega factory. This serves to be a powerful driving force to beef up local supply chain of spare parts of semiconductor equipment in the future.

Source of information : ASML、CMoney

National defense Industry

Defense budget of Taiwan

Year	2015	2016	2017	2018	2019	2020	2021	2022
Budget (NT B)	305.3	309.3	305.7	313.7	324.1	335.5	347.9	354.7
Yearly growth rate (%)	4.77	1.31	(1.16)	2.62	3.32	3.52	3.70	1.95

Source of information : DGBAS, EY, Taiwan

- 💡 Defense budget of Taiwan is increasing yearly which peaks in 2023 at NT 415.1 B
- 💡 Deployment of defensive missile system is on top of Taiwan defense.

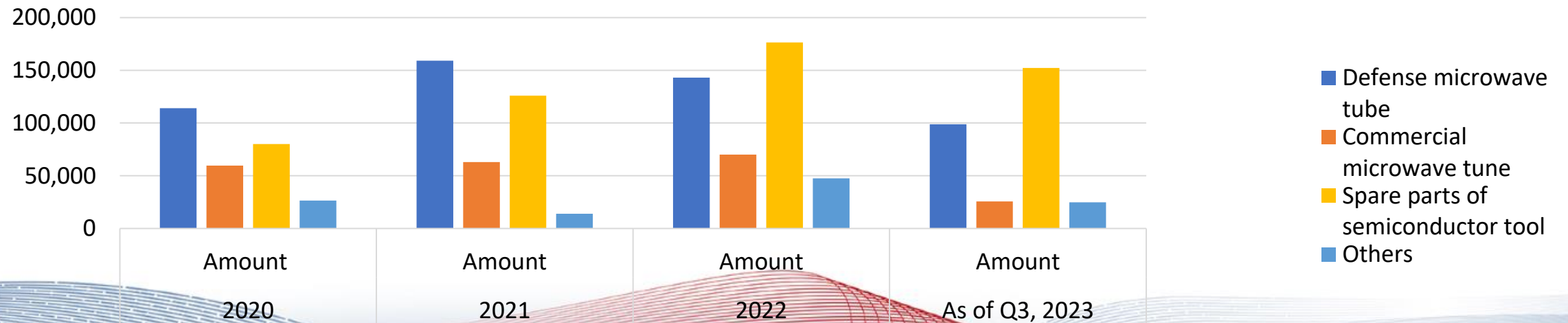


4、Financial Information

Operating Revenue (By products)

NT (k)

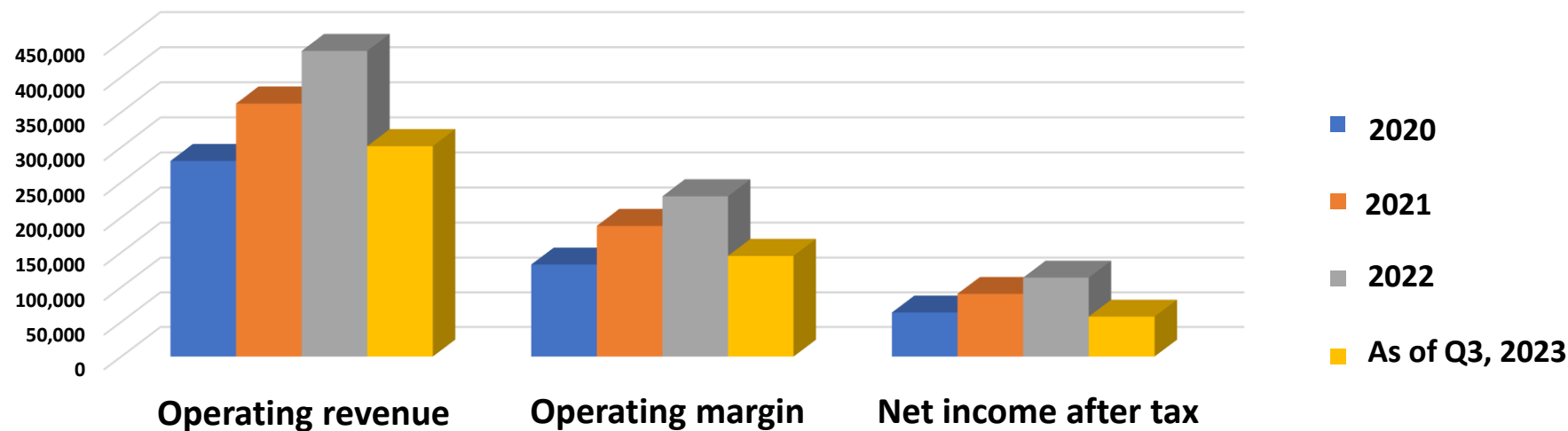
Year	2020		2021		2022		As of Q3, 2023	
Items	Amount	%	Amount	%	Amount	%	Amount	%
Defense microwave tube	114,088	40.69	159,110	43.93	143,104	32.73	98,788	38.84
Commercial microwave tune	59,717	21.30	63,036	17.40	70,092	16.03	25,687	7.41
Sub-total of microwave tube	173,805	61.99	222,146	61.33	213,196	48.77	124,475	41.29
Spare parts of semiconductor tool	79,990	28.53	126,044	34.80	176,420	40.35	152,287	50.51
Others	26,587	9.48	14,001	3.87	47,573	10.88	24,727	8.20
Total (NT k)	280,382	100.00	362,191	100.00	437,189	100.00	301,489	100.00



Financial Information

NT (k)

Year	2020	2021	2022	As of Q3, 2023
Items				
Operating revenue	280,382	362,191	437,189	301,489
Operating margin	132,544	187,787	230,025	145,060
Operating margin rate	47.27%	51.85%	53.00%	48.11%
Net income after tax	63,548	90,380	113,762	57,540
EPS(NT)	2.05	2.92	3.67	1.83

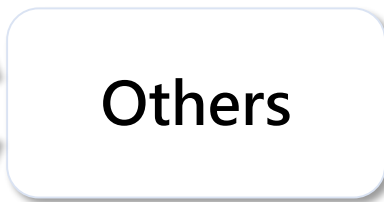


5、Future Outlook

R & D results

Comparison between microwave heating and conventional furnace heating

Heating source	Heating mechanism	Energy conversion efficiency (%)	Heating rate	Heating uniformity
Microwave (vacuum tube, magnetron)	Volumetric heating	70%~75%	Fast	Poor (note)
Microwave wave (solid state device)	Volumetric heating	35%~40%	Fast	Poor
Conventional furnace	Surface heating + conduction	20%~30%	Slow	Good



Note : Wave Power has patented proprietary microwave heating technologies which significantly solve the ever-present problem with heating uniformity in an efficient way by using magnetrons.

Applications of microwave generator -- MPCVD diamond 、 Li battery of EV



Microwave system

=

Microwave generator

+

Process chamber

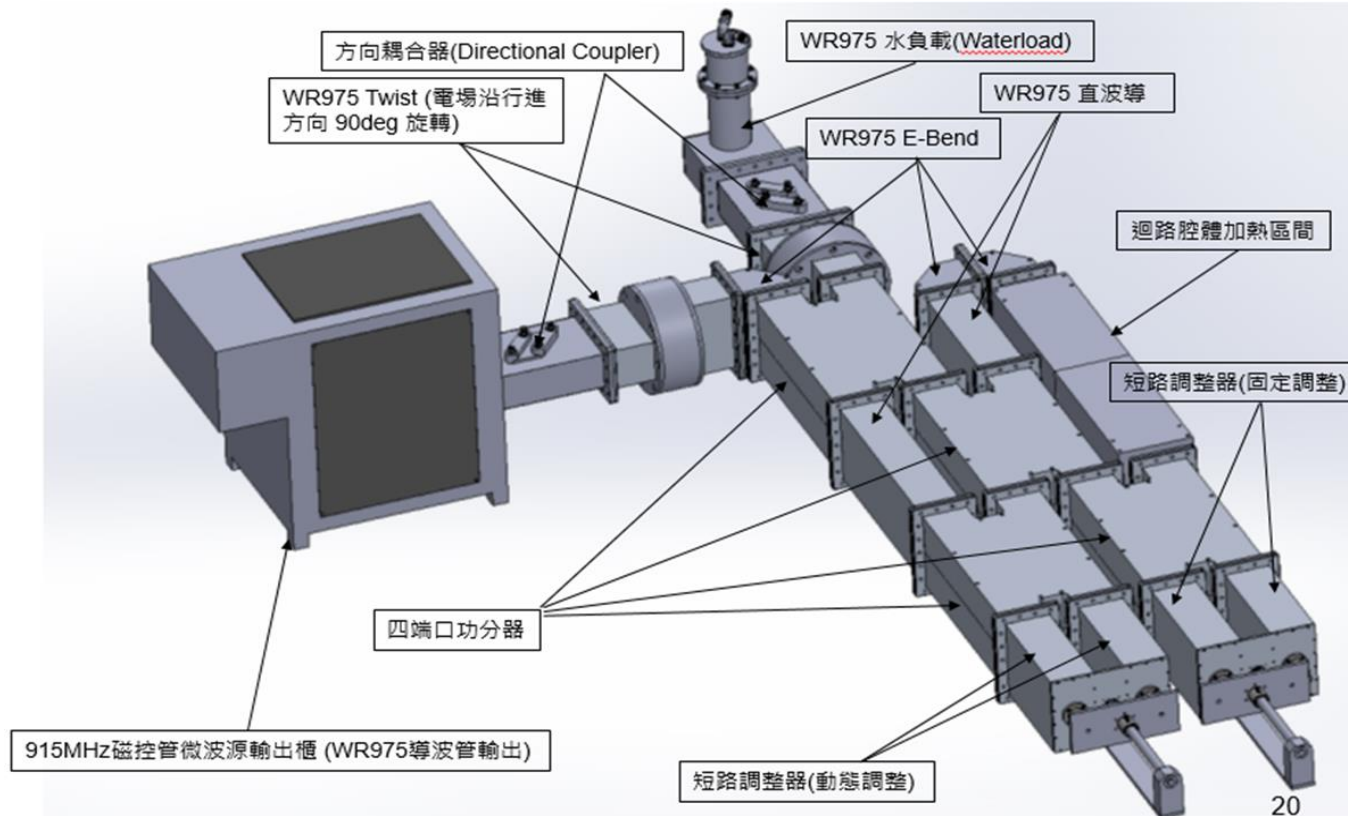


- * HVPS
- * magnetron
- * microwave components
- * control module



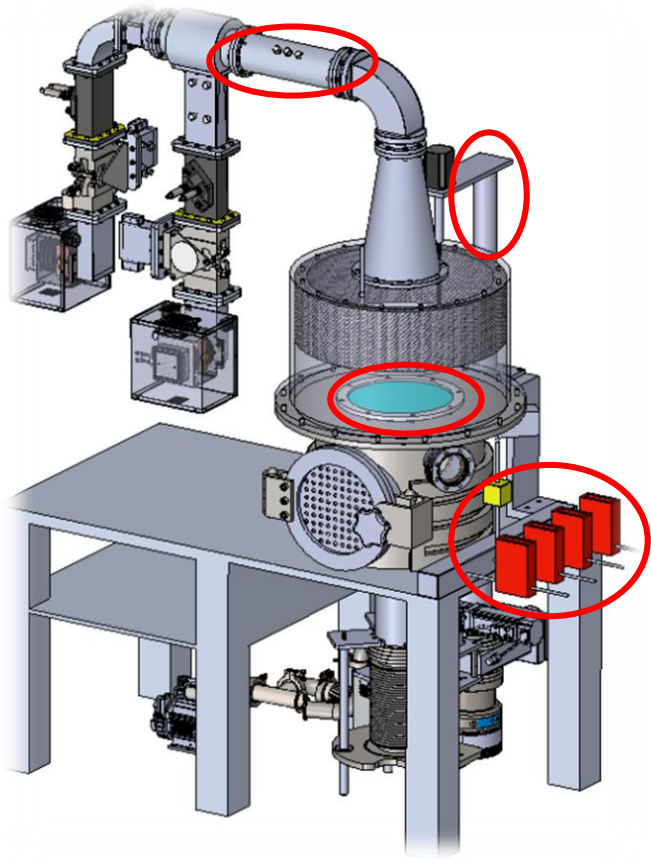
- * microwave uniformity

Applications of microwave system--shoemaking



Schematic of our patented microwave system

Applications of microwave system – MPCVD diamond



- 💡 Patented technology of power combination of two microwave sources.
- 💡 Aiming at MPCVD diamond disk of a large area.

Process gas
(CH₄ · H₂ · O₂)

Applications of hermetic sealing--medical



Transmission type X-ray equipment of NanoRay Biotech

- 💡 Dosage reduction by 80%
- 💡 Reduction of power consumption by 90%
- 💡 Better image

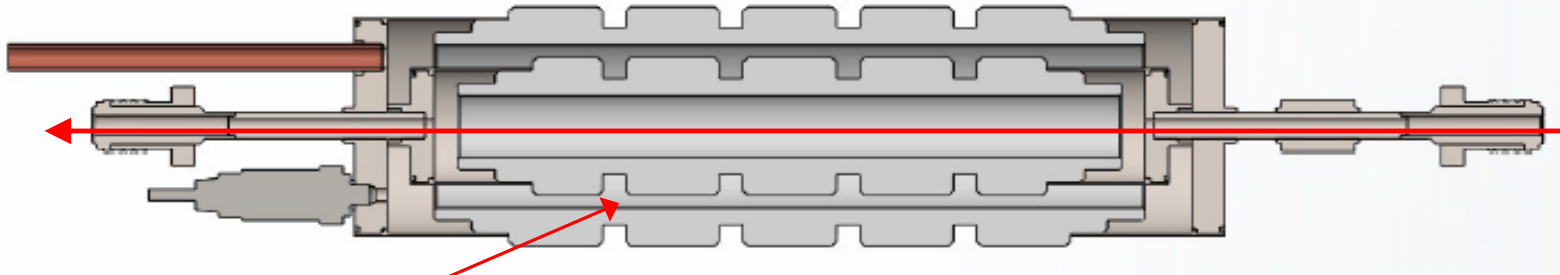
Technology provided by Wave Power

- 💡 HV, High vacuum
- 💡 Hermetically sealed assembly of ceramic vacuum envelope and metal target/Be window

Double-layer HV insulation section--semiconductor



With this component, all widely used SDS of ion implanters could be replaced by a cost-effective centralized gas supply system.



The expensive process gas BF3 goes through the center pipe

The space between inner insulation layer and outer insulation layer is filled with SF6

Future orientation of development

1 Keeping pace with the ever-increasing semiconductor industry

2 Exploring more innovative applications of high power microwave





THANK YOU

Wave Power Technology Inc. Presentation