非線性光學晶體、*x*-光檢測、加速器、高能微波

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非線性光學晶體: RKTP – high resistivity KTP crystal

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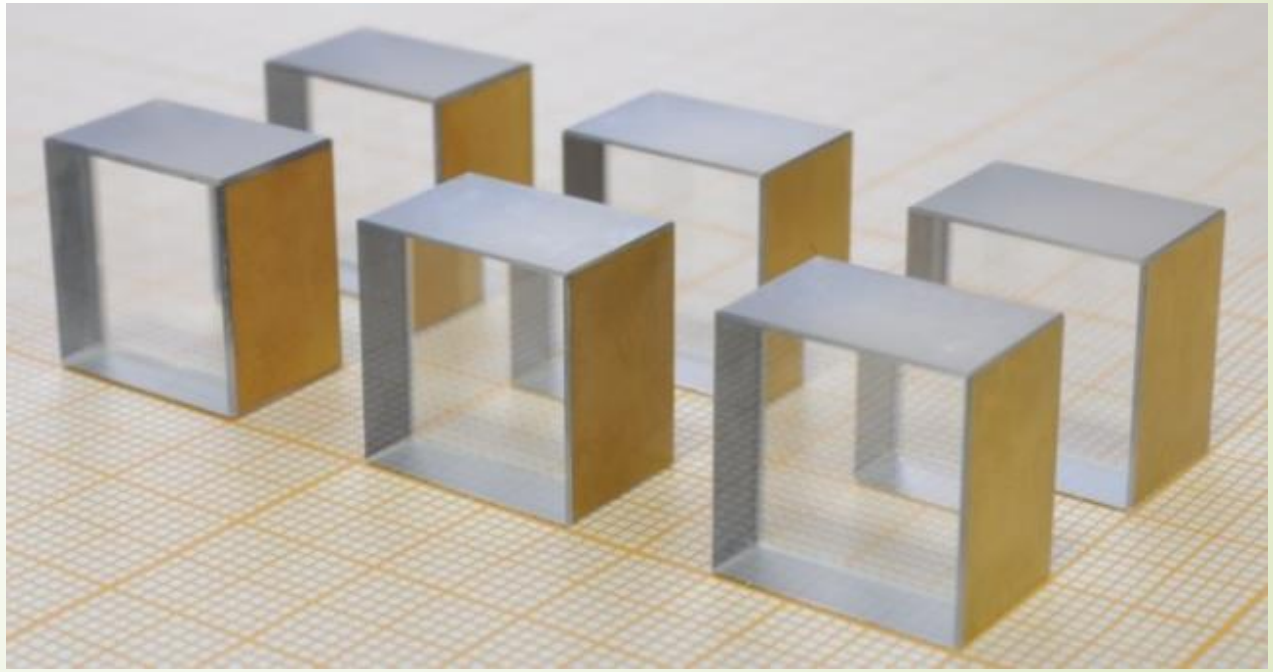
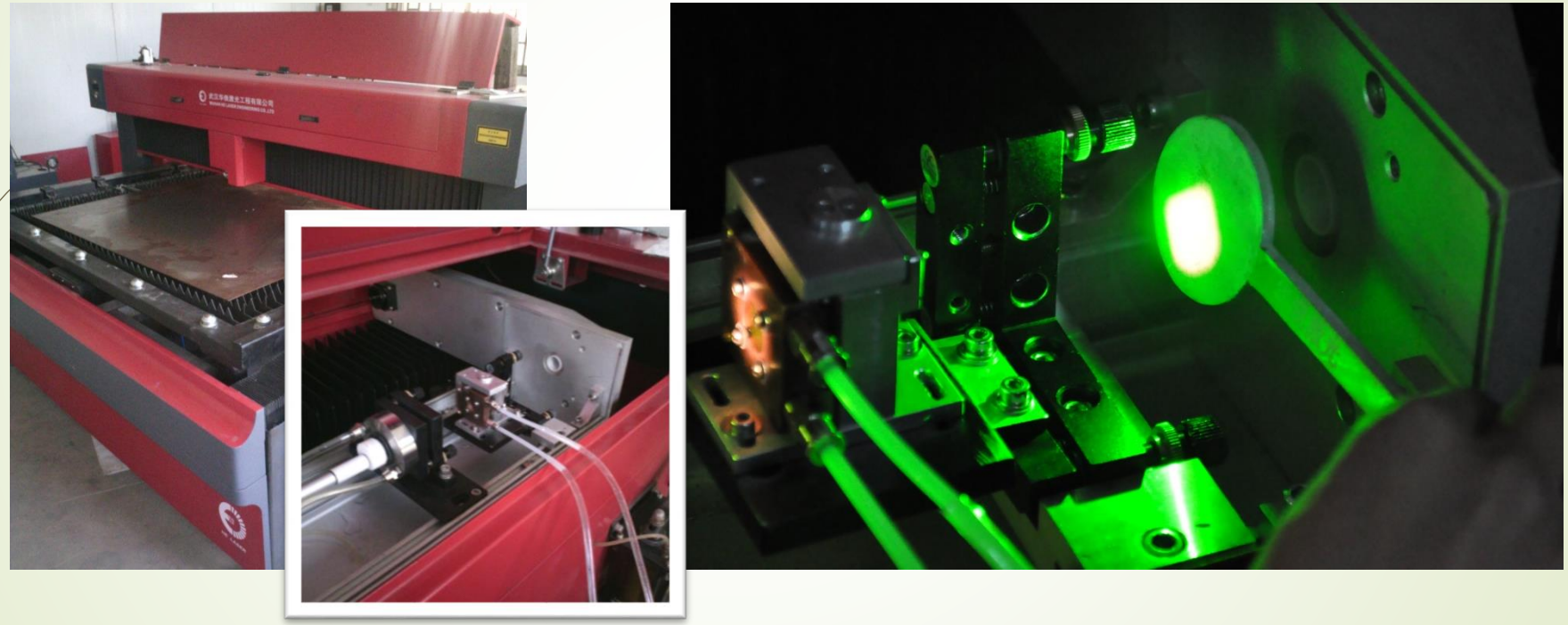


Content extracted from slides in the Taiwan-Russia Scientific and Technological Forum, Moscow, Aug. 2017

每一個綠光雷射(1-3 mW)比裡頭都有一個KTP晶體，但是無在高功率下工作

工作在高功率下的 KTP是俄國技術長處：高功率率光倍頻雷射



Successfully tested the device for SHG in a machine for cutting metals of company HE Lasers Ltd. with an average power of 500 Watts

Content extracted from slides in the Taiwan-Russia Scientific and Technological Forum, Moscow, Aug. 2017

Periodically poled RKTP crystals
準相位匹配晶體 - 高效率雷射波常轉換器

→ 高功率中紅外光雷射 → 科研、醫療、環保、國防

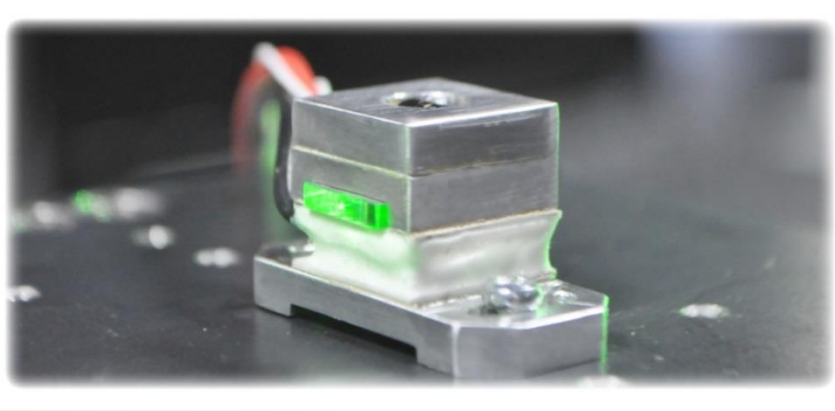
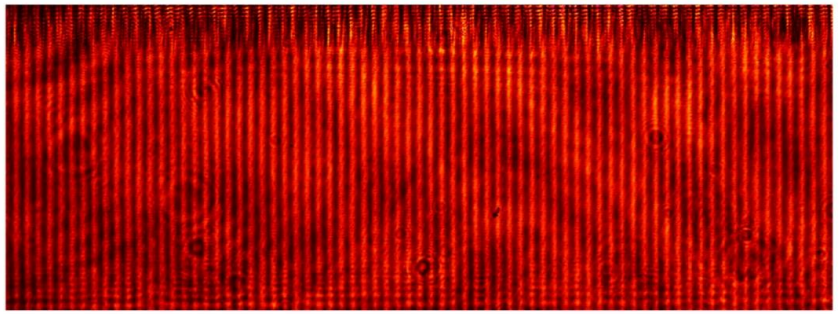
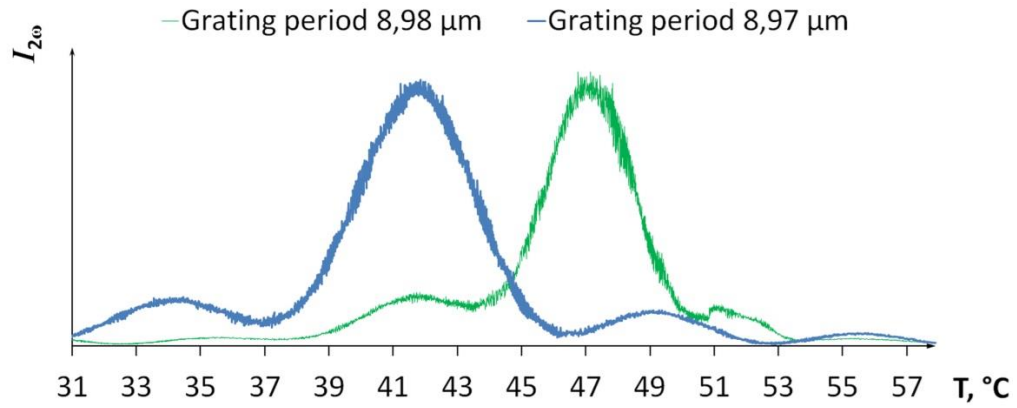


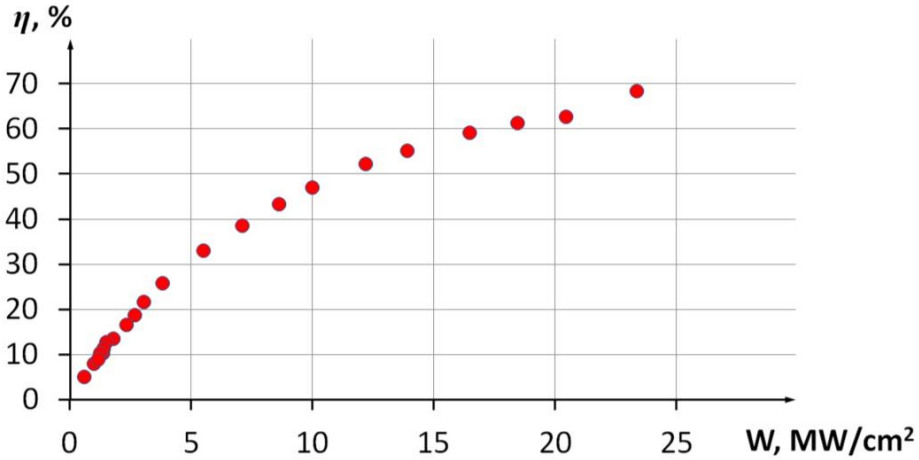
Photo shadow pattern periodically poled domain stucture in RKTP crystal



The temperature dependence of the second harmonic generation in PPRKTP crystal

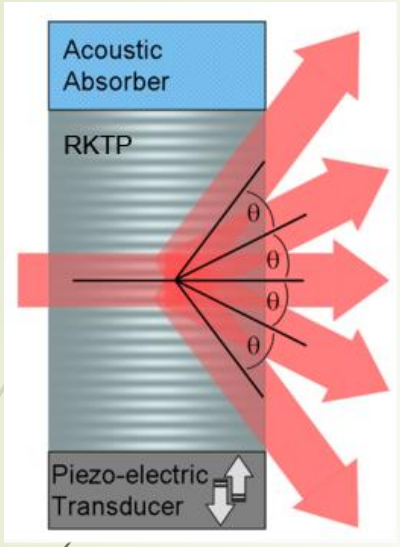


The dependence of the efficiency of second-harmonic generation from the power density of the pump radiation



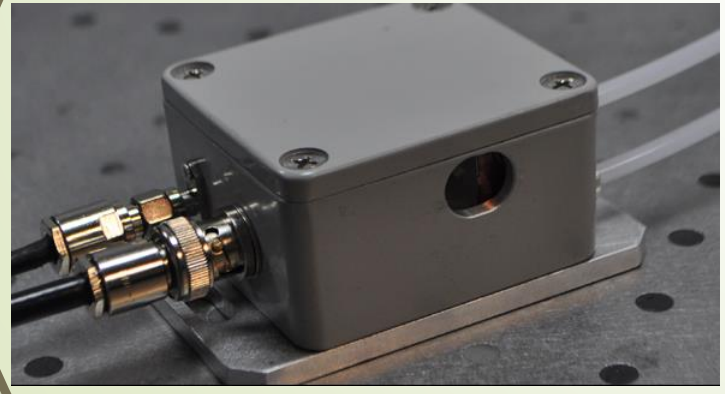
Content extracted from slides in the Taiwan-Russia Scientific and Technological Forum, Moscow, Aug. 2017

Laser Q-switch: Acousto-optic RKTP Q-Switches



✓non-hygroscopic
✓internal loss to 0,0015%
✓the temperature of no effect on the operating voltage

- Element dimensions: 8x8x20 mm^3 (Y, Z, X);
- Light polarization: linear
- Operating frequency: 40 MHz
- Loss modulation: >85%
- Rise time: 93 ns/mm
- Deflection angle (1064 nm): 5,8 mrad @ 40 MHz
- RF Power level: 30 Watts



In the laboratory of Huazhong University of Science and technology (華中科大) successfully tested a EO Q-switch in the experimental laser with an average power of 300 Watts

Content extracted from slides in the Taiwan-Russia Scientific and Technological Forum, Moscow, Aug. 2017

x-光影像檢測

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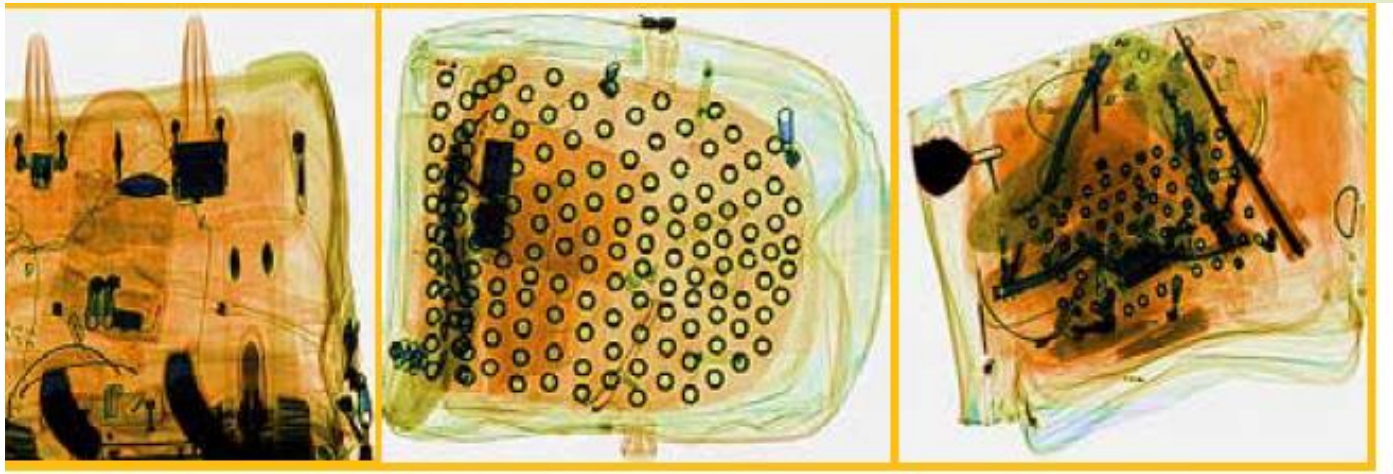
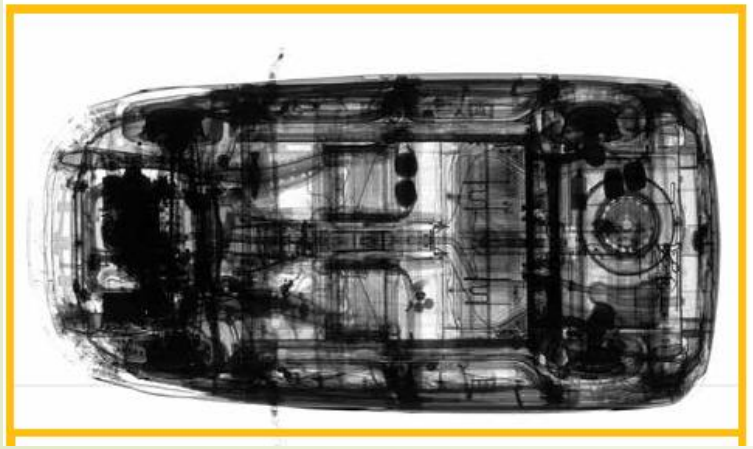
Special assistant to the president of IAE

Further information: http://inwdt.com/





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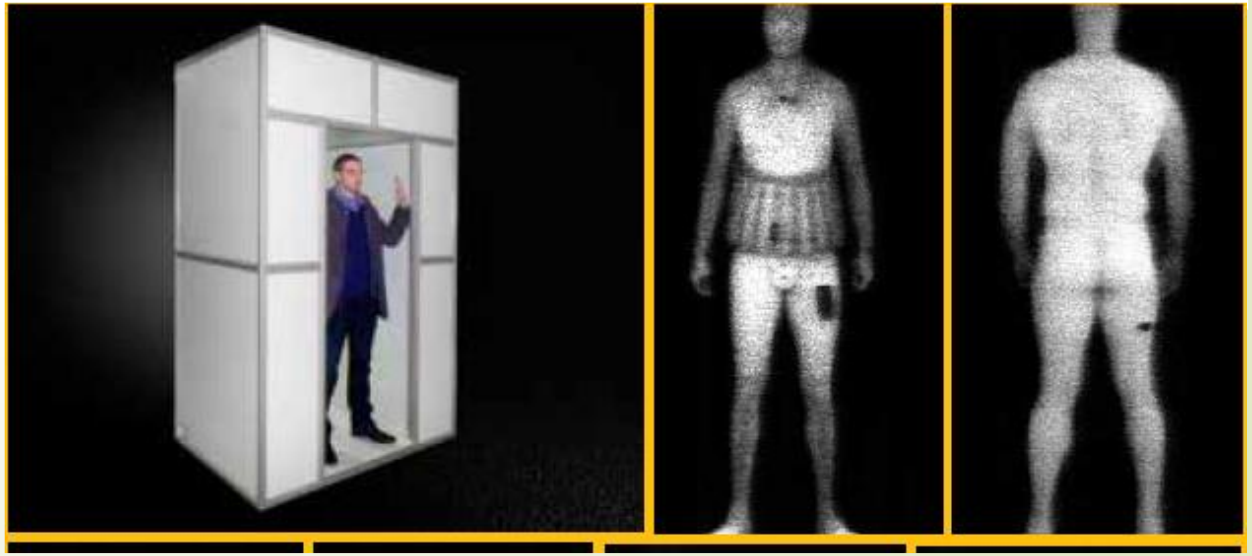


俄方已經開發出成熟的軟硬體

extracted from INWARD catalog

商業機會：全球防恐商機將延續多年

範例：**清華同方威視是**北京清大最成功的事業

2016年的銷售額
38.6億元人民幣

“China, as we have certain information, originally got this technology (X-Ray accelerators) from Russia. And, because this technology requires deep expertise in the area, China, we believe, is quite behind Russia….” Alexander Okunev

國內相關產業

http://www.machvision.com.tw/index.php/zh-tw/

精彩無限光影技術有限公司

PC板檢測

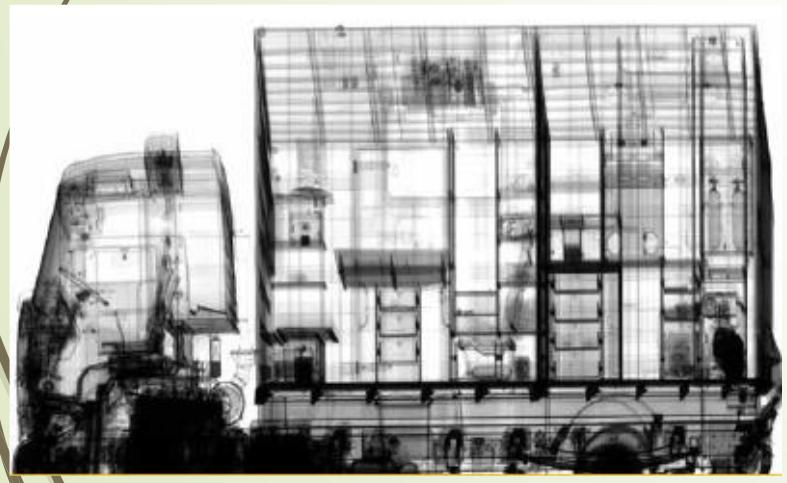
http://www.narovision.tw/

俄方提議的合作部分：“Large inspection system”

Our expertise includes:

- Extensive experience in the development of electronic equipment on modern controllers from Cortex M0 to Cortex M7, to FPGA, etc.
- Deep experience of programming in C ++, etc.
- Our specialists are now working extensively with different types of radiation (including X-ray radiation), with elementary processes in media (including scintillators), with materials (including plastics).
- We have developed SCADA DNA system 20XX for data collection and processing from various kinds of sensors for dispatching and process automation.

extracted from INWARD catalog



Proposal by Alexander Okunev

Russia-Taiwan R&D Cooperation for Upgrading Large x-ray Inspection Systems

Moscow 07 Sept 2017

We envision potential RU-TW R&D cooperation in the following topics related to the Large Inspection Systems.

To add functions to the examination complex by registering license plates, and also by binding these numbers with the results made by the inspection complex.

1. Introduction to the software package of service programs a expert advisory block that provides “hints” to the operator, focusing on suspicious objects.
2. Include the recognition blocks of certain objects in the X-Ray image.
3. To modernize the registering equipment in order to reduce its cost and create conditions for improving recording methods (increasing the speed, improving the collection of secondary photons). It is planned to focus on plastic scintillators, which are now quite widely produced and at a lower cost, they can receive more information.
4. Develop the equipment for monitoring the parameters of the diagnostic X-ray beam in real time and the introduction of these values into the control computer for their registration in processing software programs.
5. Modernization of registering equipment with the purpose of recording the direction of arrival of the X-ray quantum with the goal of the transition to the tomographic registration regime, including the registration of Compton quanta. This upgrade means the transition from a flat image to a 3D image.
6. Joint work on the modernization of X-ray radiation sources.

Our team consists of Russian scientists and technical experts from different Russian scientific institutions.

關鍵技術：

x光產生（電子加速器、微波）、重電設備、x光影像擷取、影像分析（軟體）

相關商機：

半導體製程設備、高能科研設備、國防設備

結論

1. RKTP是重要的高功率雷射元件（Q-switch, 波長轉換）
- Potential partners: 中科院、雷射加工機廠商

2. 俄羅斯有完善的X光影像設備及技術
- 台灣 IC/PCB/車廠/醫院 3-D影像檢測應該有需求
- 在全球反恐的氣氛裡應該是商機無限

3. 高能設備（重電 up to 1 MV、輻射 up to GW、加速器）一向是俄羅斯獨步全球的專長，經營管理是台灣的亮點，政府及國營單位積極投入台俄合作將有機會建立互補互助的雙贏