

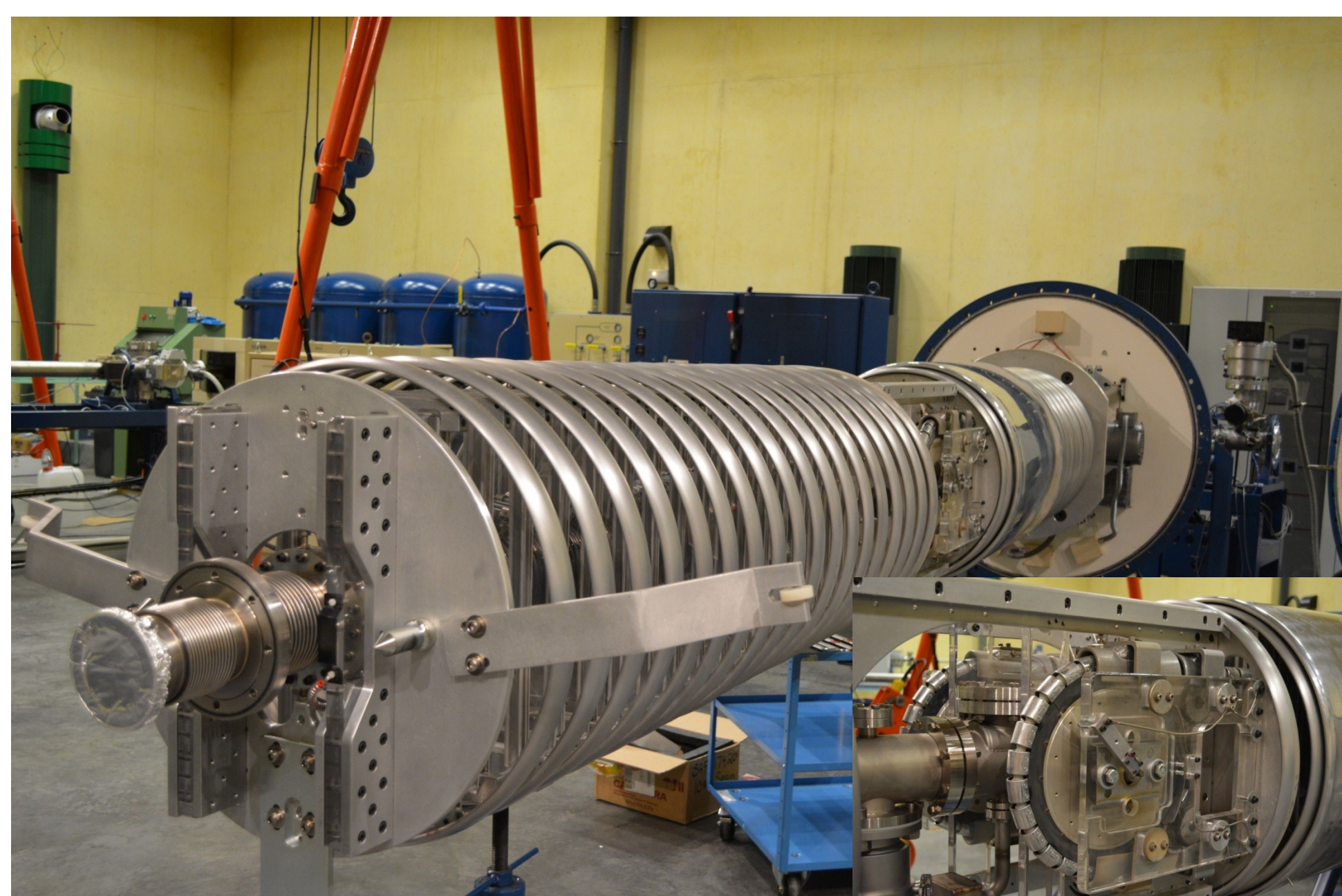


LEAK DETECTION AND REPAIR IN THE ACCELERATOR COLUMN



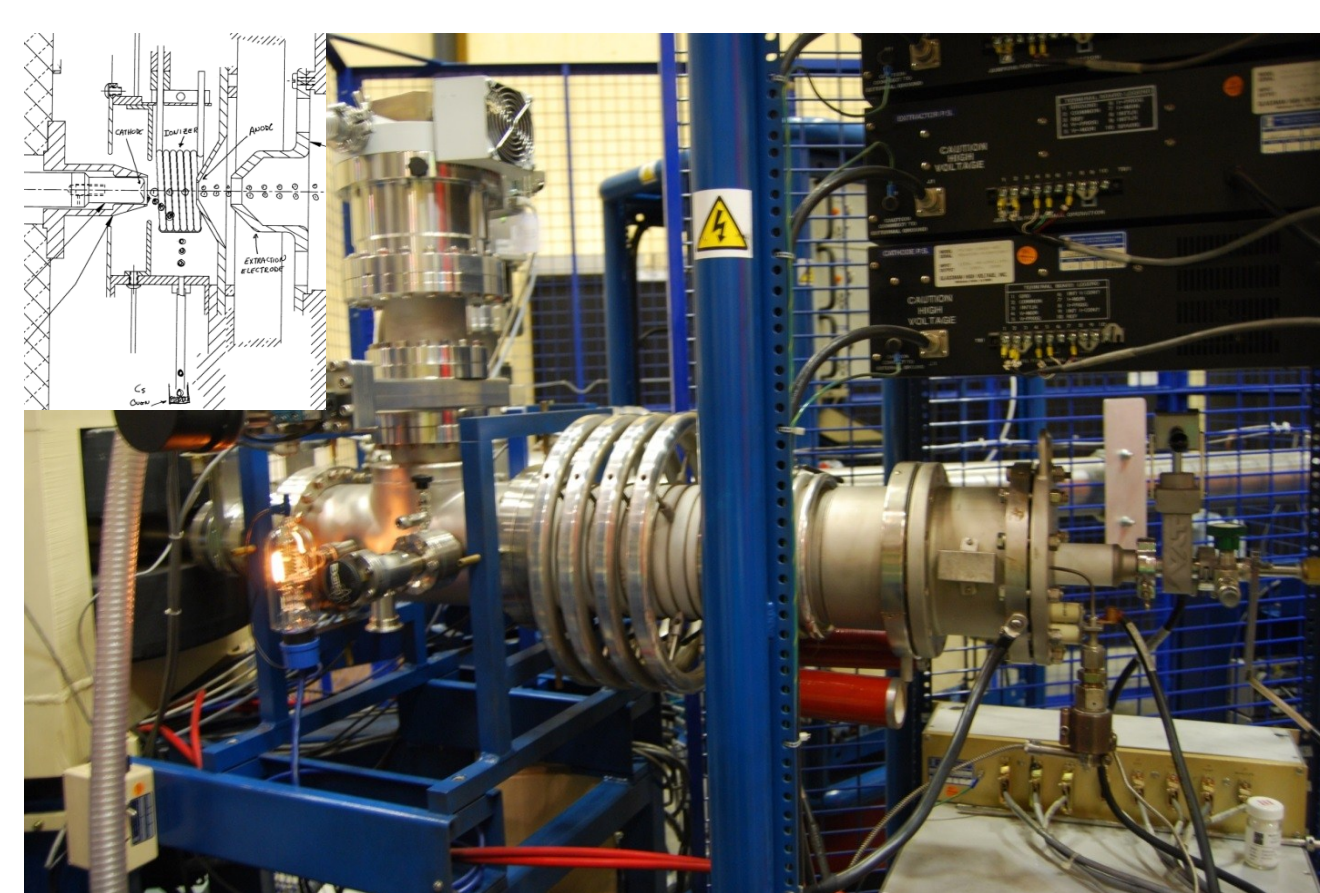
PELLETRON

- The N.E.C. Model 9SDH-2 Pelletron is a 3,0 million volt tandem electrostatic accelerator.
- Its capable of acelerating a variety of ions species over a broad range of energies for use in backscattering, PIXE, implantation, and nuclear physics experiments.
- The Pelletron gets its name from the metal pellet charging chains which are highly efficient, provide long life, need little maintenance and provide extremely stable terminal voltage conditions.



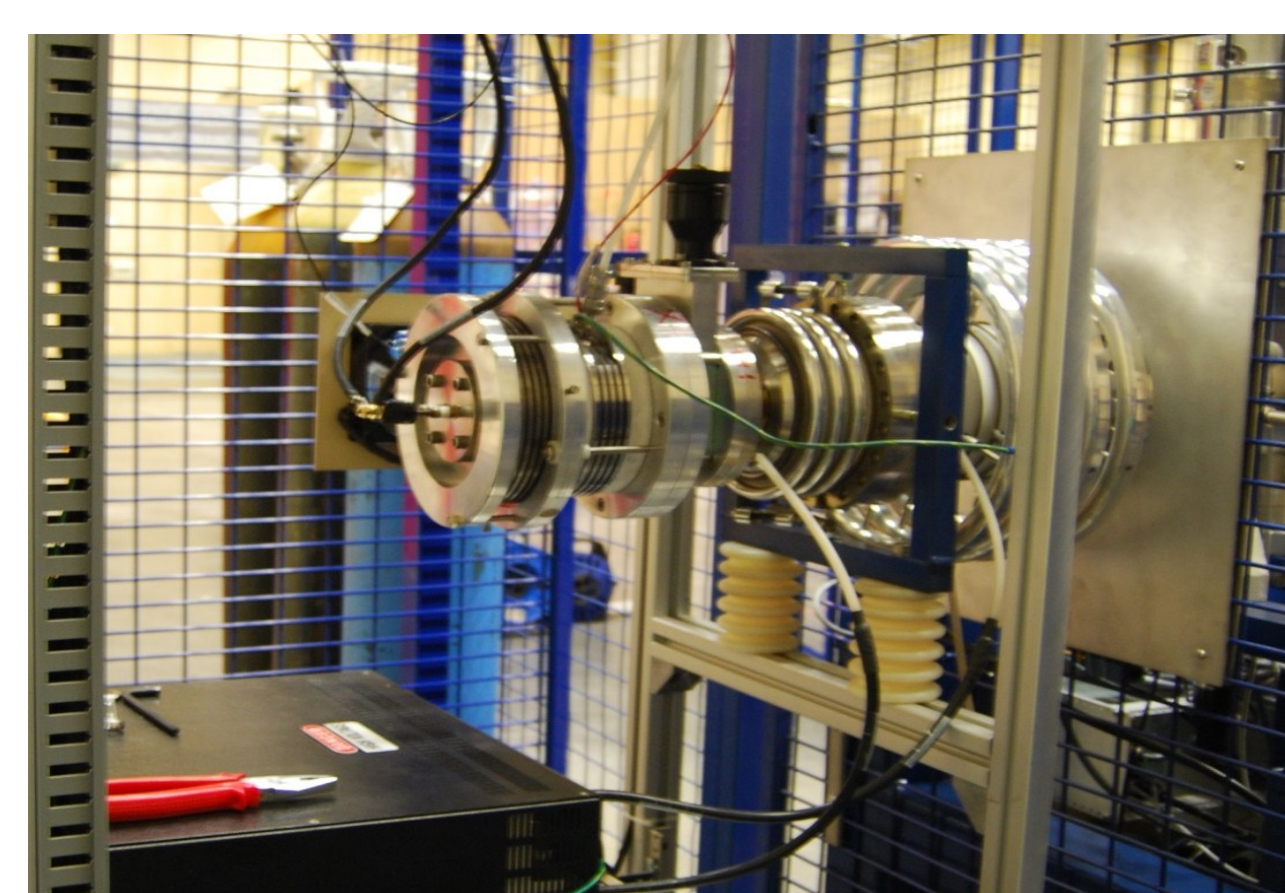
SNICS SOURCE

- The SNICS II is the most versatile negative ion source presently available.
- Extremely reliable.
- Often days of stable, continuous beam production from a single cathode.



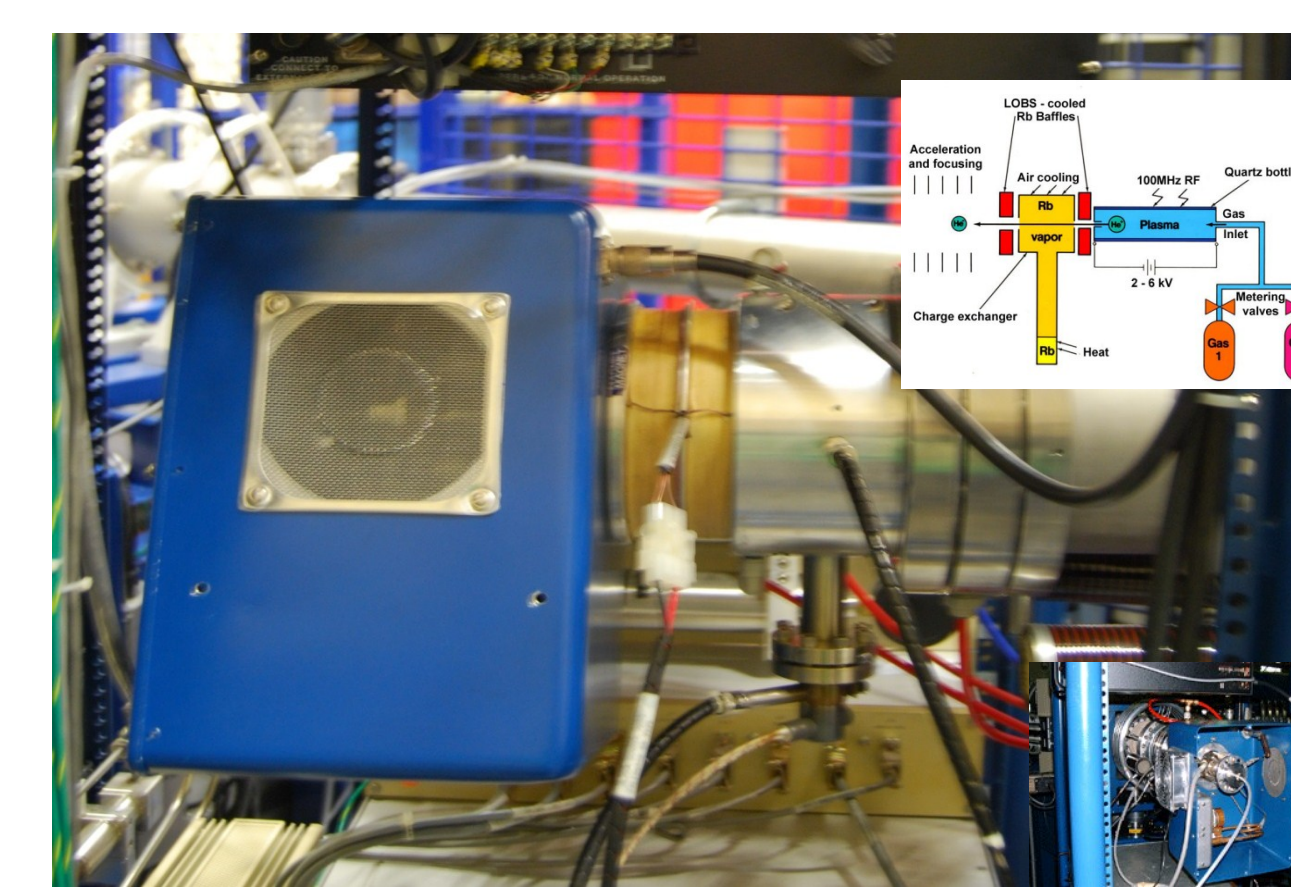
DUOPLASMATRON SOURCE

- Gas source mainly devoted for producing H.
- High ionization efficiency (>80%)
- *Very reliable*
- Provides a *high-brightness beam*.



RF SOURCE

- Exclusively used for producing He⁻ ions.
- Based on radiofrequency techniques (Alphatross).



LEAK DETECTION AND REPAIR OF VACUUM IN THE ACCELERATOR COLUMN

A leak located in the high-pressure tank is one of the most feared problems for a tandem Pelletron accelerator. This type of situation usually requires disassembly of the accelerator followed by an extensive leak detection effort. The accelerator can be down for many weeks or months before operations can restart. In early July 2013, this situation occurred with the 3 MV model 9SDH-2 Pelletron accelerator located at the CNA.

PROBLEM:

The vacuum started deteriorating inside the tube after a spark. It was found out that residual gas inside tube was SF₆. The pressure of SF₆ tank was decreasing, the maximum voltage was 2.3MV

Hunting of leak:

Hunting of leak: Leak detection just after the tank opening. A leak detector was connected to the low energy terminal. The procedure employed was same as conventional leak detection. Accelerator tubes were sprayed with helium. The leak was very small, the leak wasn't detected.

We had to disamble the low energy column. We had to look for the leak in each tube.

The leak was detected in second tube of low energy column.

Tube replacement:

Tube replacement is a very hard job and requires many fore preparations. So the damaged tube was replaced with a new accelerator tube.

Condition:

During the same installation time alignment of the machine was taken care. Again leak checking was done and the tube was baked properly. The tank was closed again and was conditioned for about four days. today the terminal can reach its maximum voltage stably(3MV).

