The Tandem accelerators center in Bucharest

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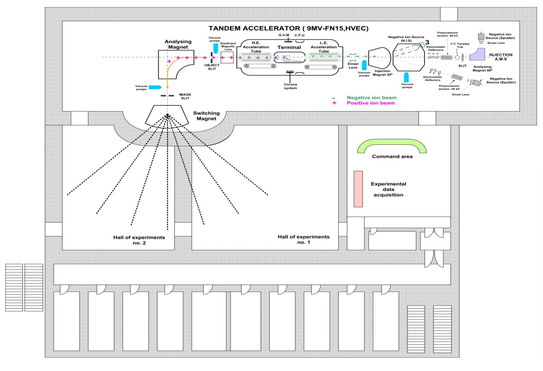
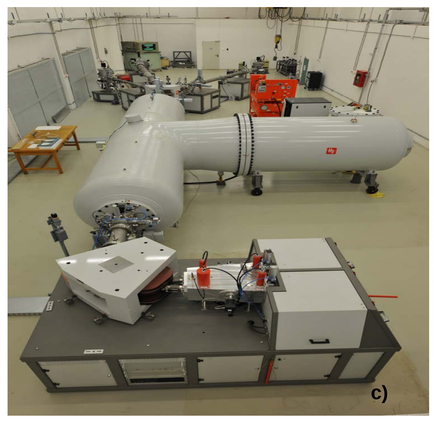
Logistic base of Tandem accelerator center which include the Van de Graaff 9MV Tandem, 1 MV and 3 MV tandetron models respectively



a) The electrostatic accelerator Van de Graaff type 9MV presented as a principle in terms of schematic

b) The electrostatic accelerator Van de Graaff type 9MV real presentation



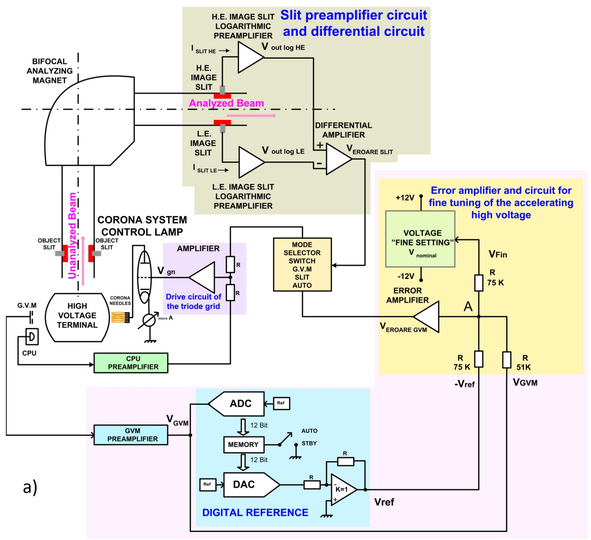
- c) the 3MV Cockcroft-Walton Tandetron accelerator for IBA
- d) the 1MV Cockcroft-Walton Tandetron accelerator for AMS and C-14 dating

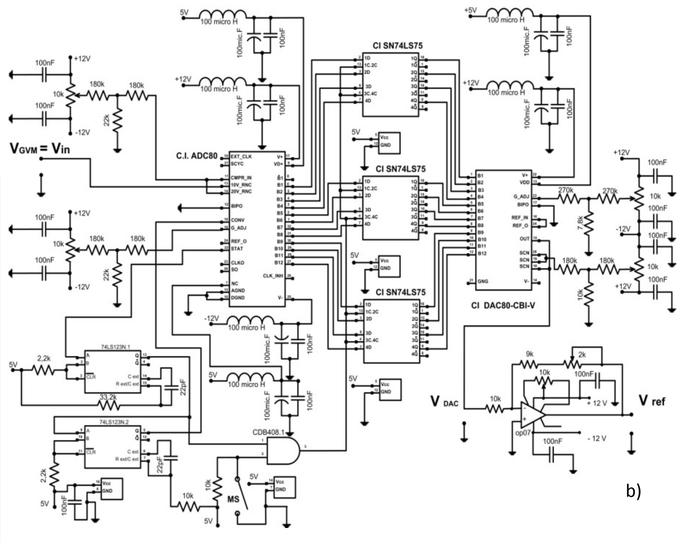
The directions of the research activities and technological development are:

➢ **The design and the implementation of a new system of stabilization into energy of the beam of charged particles to the electrostatic accelerator 9 MV tandem through:**

- ❖ The implementation of a new concept for obtaining the error signal through the way of interconnecting the signals, GVM, SLIT, CPU
- ❖ The increase of the sensitivity in terms of electrical signals due to the modernization of the electronic circuits from the composition of the energy analysis system used at the tandem accelerator 9MV

A first objective concerns the modernization through the design and the implementation of a new system of stabilization into energy of the beam of charged particles, this being structured like this:

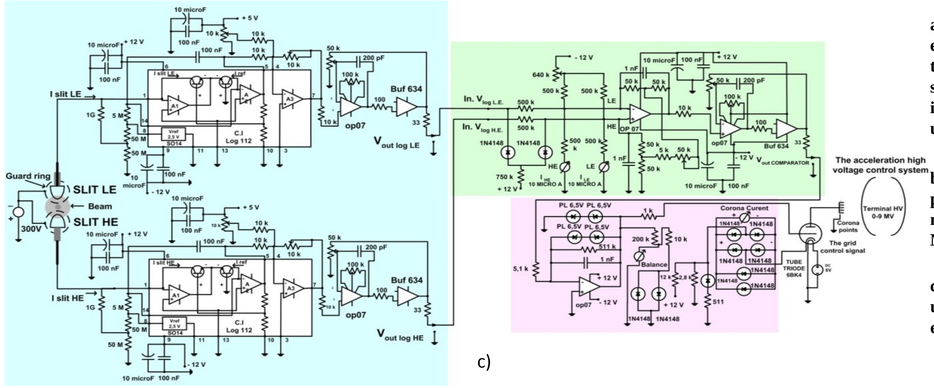




a) It presents the new block diagram of the energetic stabilization of the beam used in the development of the new electronic system. It differs from the previous through its method of obtaining the error signal, using GVM.

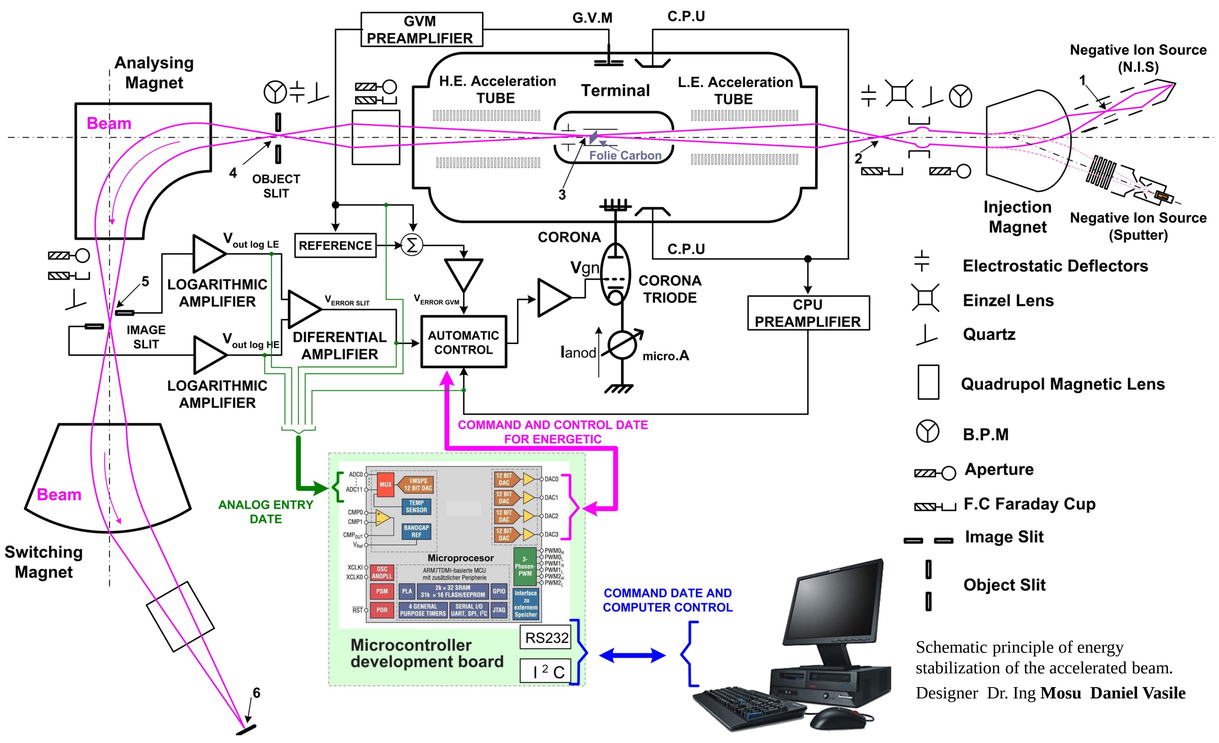
b) It represents the new electronic scheme performed to obtain the error signal in the manner of stabilization Generator Volt Meter (GVM)

c) This scheme represents the electronic upgrading from the composition of the energetic analysis system accelerator beam.



A first objective concerns the modernization through the design and the implementation of a new system of stabilization into energy of the beam of charged particles, this being structured like this:

- **the implementation of a new concept for obtaining the error signal with the help of Generator Volt Meter (GVM).**
- **The growth of sensitivity in terms of electrical signals due to the modernization of the electronic circuits from the composition of the analysis system of the accelerator beam energy..**
- **the electric signals that maintain at the rated operating capacitiesof the accelerator will be interconnected and managed by a dedicated software system, in this way it will be created the previews of the partial or total computer integration, contributing to an operational fluidity with the human Operador.**



Schematic principle of energy stabilization of the accelerated beam.
Designer Dr. Ing **Mosu Daniel Vasile**

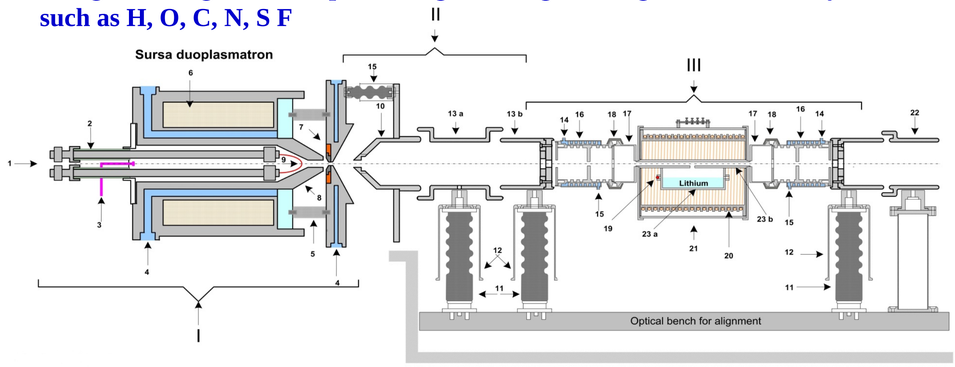
The objectives of the research-development activities

- **The proposal of modernization through the design and implementation of a new energy analysis of the accelerated beam, which will use new generation electronic components which facilitate the software interconnection between these and the computer. Thus, in terms of technology ,it will be the subject to the current requirements of the beam accelerator domain.**
- **The construction of the new set of additioning in lithium vapors to obtain the negative charged helium ions, with own technology opens up new opportunities for technological diversification, regarding the obtaining of additioning in the vapors of other alkali metals such as sodium, potassium, cesium and others . Another important aspect of the technological development is the ability to control and monitor the optimal paramenters using the computer.**
- **The most important argument of the methodical developments at the 9 MV Tandem accelerator, is represented by the technological novelties made by the efforts of our own technical team, opening the possibility of approval or patent our own products, thus facilitating the access to the commercial space dedicated to the particle accelerator.**

➢ **The design and the implementation of a new configuration of source that provides negative ions of He in the duoplasmatron assembly, ion-optical bench;**

- ❖ The designing a new set of additional lithium vapors, whose properties are:
  - o Lithium vapors capture efficiency
  - o The construction of thermal gradient chamber
  - o Galvanic separation module of the elements of acceleration
  - o Duoplasmatron gas flow control and load exchanger

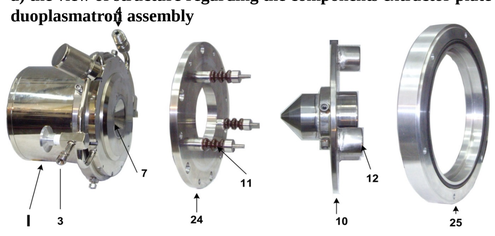
A second direction technology development is the construction of a duoplasmatron-type source with the charge exchange in Li vapors for generating the negative ions mainly of helium, but of other ion species such as H, O, C, N, S F



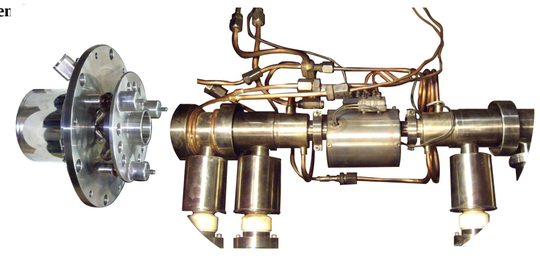
In this picture it is shown the new source as being one of the original contributions that have been designed in the technological developments that lay at the basis of the PhD thesis.

The duoplasmatron assemblies - ion optical bench that have been designed and implemented, with the role of providing negative ions mostly helium and other ion species: H, O, S, N, F, C

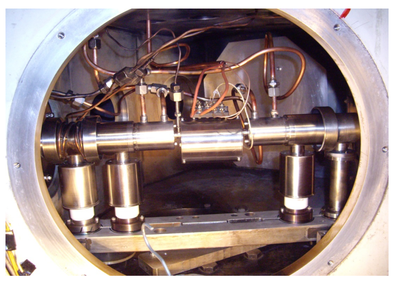
a) the view of structure regarding the components extractor plate duoplasmatron assembly

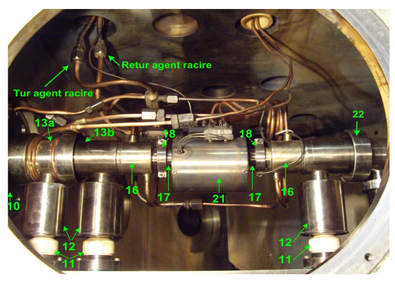


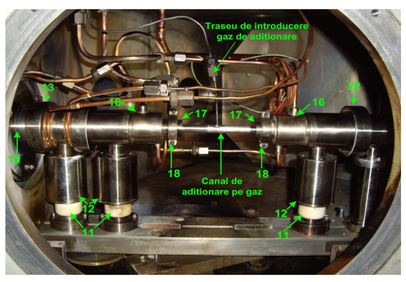
b) The presentaion of the structural components that compose the completed ionic-optical ber



Ion-optical bench models developed through own technologies for obtaining negative ions using the duoplasmatron in the technical laboratory of the tandem accelerators department (DAT)







The Annexes of the source of negative ions, Duoplasmatron type

Installations for obtaining the ions at the electrostatic accelerators, as well as energetic selection appropriate for the experiments, these being designed and developed by own conceptions.

A second proposed objective refers to the technological development of the power supply of negative ions of duoplasmatron type

In this way there will be created features which include technological diversifications regarding the vapor additioning, obtaining of other alkaline metals, of combined type raported to the type of the desired beam, and also of the control, software monitoring computer.

The schematic diagram of physically and electrically processes with duoplasmatron type source that provides negative ions
Designer Dr. Ing **Mosu Daniel Vasile**