



Contribution ID: 21

Type: **Poster**

P04 - High voltage scanning ion microscope: beam optic and design

Friday, 11 July 2014 13:00 (1 hour)

This article focuses devotes to a conceptual design of a high voltage ion microscope. This setup is a further development of compact ion microprobe. Probe formation after a ion source is the main distinction of the proposed design, like it in electron microscopes. Traditional microprobes use only a small fraction of a beam current from source. Most of it is lost on a object and angular collimators. Therefore it is advisable to use a high intensive ion sources in the high-voltage ion microscope. Small amount of the sources current will be compensated by it more fully using and higher acceptance of probe forming system.

Constructively ion optical system is divided into two parts: the ion injector and probe- forming system. The structure of the injector includes an ion source with a small emission aperture, a Wien filter and an axial lens. The lens forms an output crossover of the injector and controls its size. This crossover plays an object collimator role function. The final formation of the beam is made by the probe forming system. It consists of an accelerating tube and multiplet of quadrupole lenses. Inclusion accelerating tube in the probe forming system will reduce the size of the microprobe and improve its performance.

We studied the ion-optical properties of the proposed probe forming system taking into account the influence of the chromatic and third order aberrations energy spread of the beam at the exit of the injector and the nonlinear properties of the probe forming system. Possibility using of high brightness ion sources of existing structures as part of the injector was considered. The design of high-voltage scanning ion microscope based on optimization calculations was proposed and the ion optical characteristics were determined.

Primary author: Dr PONOMAREV, Alexander (Institute of Applied Physics, National Academy of Sciences of Ukraine, Ukraine)

Co-authors: Mr CHMERIS, Alexander (Institute of Applied Physics, National Academy of Sciences of Ukraine, Ukraine); Dr REBROV, Anatoliy (Institute of Applied Physics, National Academy of Sciences of Ukraine, Ukraine); Dr PONOMAROV, Artem (Institute of Applied Physics, National Academy of Sciences of Ukraine, Ukraine); Dr MAGILIN, Dmitry (Institute of Applied Physics, National Academy of Sciences of Ukraine, Ukraine); Dr SERGEY, Kolinko (Institute of Applied Physics, National Academy of Sciences of Ukraine, Ukraine); Mr ROMANENKO, Oleksandr (Institute of Applied Physics, National Academy of Sciences of Ukraine, Ukraine)

Presenter: Dr MAGILIN, Dmitry (Institute of Applied Physics, National Academy of Sciences of Ukraine, Ukraine)

Session Classification: Poster Session with Cheese and Wine