

Recent ion source related research and development work at JYFL

During the EURISOL-NET meeting the most important work of the JYFL ion source group was described. That included for example the beam transport and metal ion beam production. The presentation included also aspects, which are important to the production of radioactive ion beams like basic research of ion source plasmas. The ARC-ECRIS can offer an interesting option for the charge breeding and beam merging.

The presentation described the new possibility to produce ion beams from the refractory elements. The JYFL ion source group has noticed that the microwave power can be coupled to the sample of interest resulting in the vigorous heating of the sample. Further studies and development will be performed to determine the feasibility of the method. A status of the inductively heated oven was also given.

The experiments performed by the group have shown that the space charge compensation plays a crucial role in the beam transport and consequently methods to improve the compensation are sought. This is a key issue when the beam intensity of medium charge states like Ar^{8+} after the JYFL K130 cyclotron is increased.

The studies involving in the Bremsstrahlung, UV and visible light spectroscopy were described. The motivation of the work is to define the parameters affecting the breakdown process of the ion source plasma. The results can be used to optimize the time-structure of extracted ion beams. In addition, the work can possibly help enhancing the H^- surface production.

As a last item the ARC-ECRIS concept was described. The first prototype was designed, constructed and tested by the JYFL ion source group. As a consequence of encouraging results comprehensive design study was carried out. According to the study the ARC-ECRIS operating at 14 GHz and 42 GHz using copper wires or NbTi superconducting wires, respectively, are feasible. Funding to realize 14 GHz ECRIS have actively been sought.