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DECRIS-PM ion source for the DC-280 cyclotron

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A new all-permanent magnet ECR Ion source DECRIS-PM had been developed to be used at the high voltage platform of DC-280 cyclotron. The source has been designed at the FLNR JINR (Dubna) in collaboration with the "ITT-group" company (Moscow, Russia).

The operating frequency selected to be 14 GHz for the source. The corresponding values of B_{inj} , B_{min} and B_r were chosen according to scaling laws for the axial magnetic field configuration. The injection magnetic field maximum was chosen to be around 1.3 T to have a reasonable weight of the system and basing on the earlier experience of conventional ion sources.

Combination of the permanent magnet rings and soft iron plates makes the magnetic structure flexible, and provides the possibility of magnetic field correction during assemblage stage. Other specific feature of the source is an additional coil placed at the center of the structure between the hexapole and central PM ring. The coil will be used to tune the B_{min} value during the source operation.

Presently the source is under tests at the test bench. In the first experiments the intense beams of Ar^{8+} (920 μA), Ar^{11+} (200 μA), Ar^{12+} (150 μA), Kr^{15+} (180 μA) and Kr^{17+} (125 μA) were produced. The source is also tested for production of metal ion beams (Mg, Ca and Fe).

Primary author: BOGOMOLOV, Sergey (JINR)

Co-authors: Mr LEBEDEV, Alexander (JINR); Mr BONDARCHENKO, Andrey (JINR); Dr EFREMOV, Andrey (JINR); Mr KUZMENKOV, Konstantin (JINR); Mr IAZVITSKII, Nikolay (JINR); Dr KONEV, Nikolay (ITT Group); Mr BEKHTEREV, Vladimir (JINR); Mr LOGINOV, Vladimir (JINR); Dr MIRONOV, Vladimir (JINR); Mr KOSTYUKHOV, Yuri (JINR)

Presenter: BOGOMOLOV, Sergey (JINR)

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