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Towards Uranium Intensities Required for FAIR

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The Facility for Antiproton and Ion Research (FAIR), which is currently under construction at GSI accelerator center (Darmstadt, Germany), will provide wide opportunities for various scientific research programs in different branches. One of the key-elements for future FAIR experiments is uranium. After a commissioning phase it will be required up to $5 \cdot 10^{11}$ of U^{28+} ions per pulse at the energy of up to 2 GeV/u. For ion sources this requirement means that it will be necessary to provide 23 emA of U^{4+} ions at an energy of 2.2 keV/u inside an emittance of 220π mm-mrad in front of the RFQ (Radio Frequency Quadrupole) with a repetition rate of 2.7 Hz.

Vacuum arc ion source VARIS is used for production of high current uranium ion beams at GSI. Recent investigations on increasing of uranium beam brilliance and operational repetition rate of the VARIS as well as test results of various approaches will be described in this work.

Another important aspect is high ion beam losses between the ion source and RFQ due to non-optimized post-acceleration system and a beam transport line. Recently these losses are above 75%. To reduce the beam losses for uranium as well as to increase availability of high current beams of other elements it is planned to construct a new ion source terminal dedicated for uranium operation (terminal West). It will be equipped with enhanced post-acceleration system as well as with dedicated straight beam transport line optimized for U^{4+} ion beams.

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