

## The Status of the High-Energy Linac Project at GSI \*

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The High-Energy (HE) Linac is proposed to substitute the existing UNILAC post-stripper section. Mainly the post-stripper consists of the Alvarez Linac, which is in operation over four decades successfully. The main parameters of the HE Linac follow the design parameters of the existing post-stripper [1], e.g. the HE Linac reaches the same output energy of 11.4 MeV/u at about half of the length. In comparison the beam pulse length and the pulse repetition rate is optimised to the FAIR requirements. The HE Linac will not provide with long duty cycle beams [2].

In the long term the substitution of the existing Alvarez is the only possibility to provide an adequate heavy ion injector for FAIR. The need for a future substitution is confirmed by a study recording the status of the existing post-stripper for investigating its future operating risk [3].

One important milestone for reducing the operating risk is the development of a new and modularised rf system, which is in progress [4]. The rf system can be applied to the existing Alvarez section as well as to the HE Linac in short pulse operation. Negotiations with commercial suppliers concerning the prototype of a high power amplifier are expected to be closed in spring 2014.

56 percent of the total costs are assigned to the rf systems (fig.1) according to the executive summary "Proposal for the HE Linac" [5], which was submitted in summer 2013 to the GSI supervisory board and the director's board.

### Outlook

In November 2013 the GSI accelerator chain for Uranium beam was reviewed. The review committee comprised five external and international recognised accelerator experts. As a result a window for the input beam parameters for the SIS18 is defined. For providing  $2 \cdot 10^{11}$   $U^{28+}$  particles a beam current of 15 mA at a pulse length of 80  $\mu$ s within an emittance of 5 mm mrad is required for instance [6]. In addition a quasi Front-to-End simulation along the UNILAC shows, that by taking future upgrade options into account already, with the existing Alvarez section the FAIR requirements are not reached [7]. Even by substituting the Alvarez section by the HE Linac the aim is not reached per se regarding the existing boundary conditions. Currently workpackages are defined together with the Institute of Applied Physics at Frankfurt University. Starting from the Ion sources to the SIS18 transfer channel every section is re-investigated for improvements in beam quality and intensity.

\* FAIR@GSI PSP code:6-6-7-06

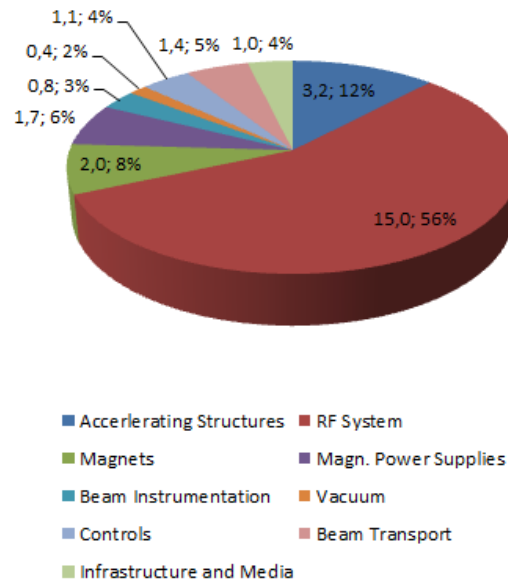


Figure 1: Investment cost of technical subsystems in MEUR and percent. The total sum is 26.6 MEUR (based on prices of 2012)

### References

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