Status of the Integration of Technical Subsystems of the SIS100 Extraction Straight Section

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The integration of all technical subsystems of the extraction straight section, sector 5 of SIS100, by means of a 3D (CATIA) modelling has been continued [1, 2]. The following devices have been added and integrated successfully to complete all necessary components for beam operation: the knock-out-exciter, the BTF-exciter, the ion beam halo-scraper, the radiation resistant quadrupole doublet, and the internal emergency beam dump. In addition, each of the technical subsystems was improved until a state to be used for the call for tender of the corresponding component. Three out of four cells in the straight section have almost been finished with respect to integration.

Integration of components

The extraction straight comprises many different components. Figure 1 shows a part of cell 3 as example. Nearly all of them needed to be revised to meet the requirements in position, in size, to allow for alignment purposes, for the connections inside and outside of the vacuum chamber, and to compensate the elongation during the bake-out of the vacuum chamber in order to achieve the necessary XHV conditions.

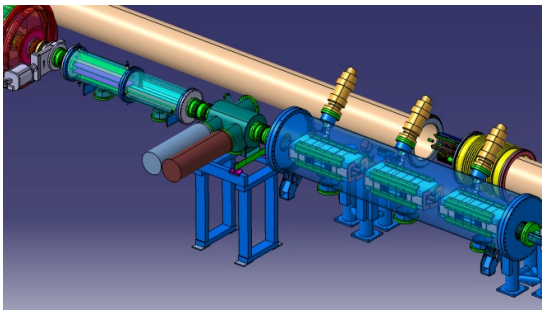

Figure 1: From left to right (part of cell 3): BTF-exciter, SEM grid and beam stopper, and triple kicker group. In the background the He-Bypass line can be seen.

Realistic solutions were implemented for all components at least up to a design stage which represents all technical requirements properly and therefore allows the final construction in a direct way.

Magnet extraction septum 3 has been equipped with a challenging but feasible solution for the guidance and connection of the complex coil system, figure 2. The main coils, blue, for the vertical deflection field, the steering coils for the horizontal deflection in case of the slow extraction mode of operation, and the correction coils, beige, are all guided in the necessary compact and independent way, maintaining the cooling water flow in the different coil sections.

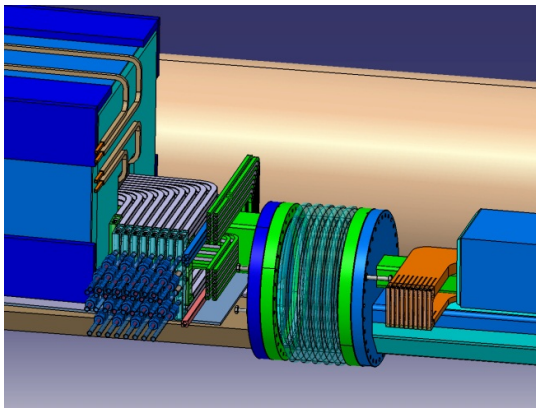

Figure 2: Detail of the crossover section between magnetic extraction septum-2 (right) and -3 (left). The bellow in the middle serves to compensate the elongation during the bake-out of the vacuum chamber and to adjust the septa in transverse direction.

The internal beam dump has been implemented by modifying the entrance section of the extractor cryostat and magnetic septum 3, figure 3. A huge gate valve allows for the passage of the circulating and the extracted beam independently.

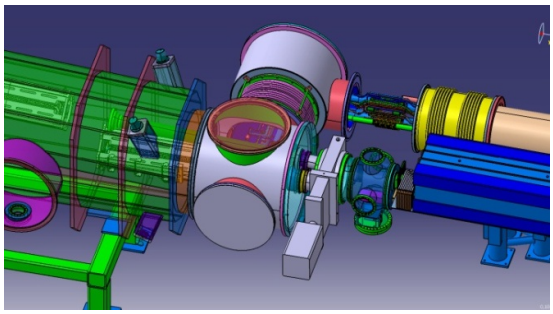

Figure 3: Crossover from MS-3 (right), via the internal beam dump, and the vacuum gate valve into the feed-in-box (grey with flanges) of the extractor cryostat (left)

References

[1] N. Pyka, et al., GSI Scientific Report 2010, Darmstadt, 2011, p. 289.

[2] P. Spiller, et al., GSI Scientific Report 2010, Darmstadt, 2011, p. 287.