

Mechanical support design for miniBeBe at MPD-NICA

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Content

The mechanical structure will be the main support for the active elements and electronics of miniBeBe. Its location and installation will be around the beam tube, in the center of the MPD (Multi-Purpose Detector). For this version, the low-cost requirements were considered, which optimized a lightweight and firm structure. The first structural design approach was made through 3D printing, which allowed us to assemble the essential parts, make decisions and adjust rigidity and precision in the cylindrical structure. The structure has been developed with the idea of a plug-and-play assembly. It is designed to remain fixed on its main axis with the possibility of being able to replace - at will - the rails that support the electronics and scintillating plastics, without having to disassemble the whole structure. Simulations of deformations of the miniBeBe structure parts were performed, which were obtained using finite element analysis using Autodesk Inventor software to approximate the behavior of the structure under critical conditions such as temperature variations and differential pressure. We develop a structure for the baseline design of miniBeBe, which has a cylindrical geometry that has been implemented in MPDRoot as an array of 16 strips, each strip consisting of 20 scintillating plastics of 20 x 20 x 3 mm³ (320 scintillating plastics in total). We also consider a second test prototype simulated in MPDRoot with a cylindrical geometry of 32 strips, each strip composed of 48 cells with scintillating plastics of 20 x 20 x 3 mm³ (1536 scintillating plastics in total).

Area of contribution

Experiment: prototypes and instrumentations

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