

**Design of the GSI 36 MHz RFQ Section by Mafia Calculations,** K. KASPAR, U. RATZINGER, GSI Darmstadt - The paper summarises the studies and Mafia calculations for the rf design of the new GSI RFQ accelerating structure (H<sub>110</sub>-mode resonator, tank diameter abt. 0.8 m, tank length abt. 9.3 m). When Mafia is applied to a tank of this size, even with optimum mesh, up to 10<sup>6</sup> mesh points, and using only one half of the symmetric tank, the resolution of the Mafia mesh is limited to about 4 mm only. Studies on an accelerating structure with similar size and complexity (GSI Wideroe Tank 2) showed that the Mafia calculations agree extremely well with the data measured in this accelerator some 20 years ago, provided the mesh is thoroughly "hand fitted" to the structure. Under this condition, it seemed justified to use Mafia as the only base for the design of the new RFQ structure, without any additional model measurements. Whenever possible, smaller subsections of the RFQ tank have been investigated with a higher mesh resolution. For studies concerning the full tank, the above 4 mm resolution is used. Details of the design procedure and the results are presented in the paper. The precision of the results is estimated to about 1 to 2%. Measures for correction of deviations of this order have been added to the design.