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Tuning of an 81.25 MHz Four-vane RFQ with a Lamped Field Profile at RISP

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A radio frequency quadrupole (RFQ) linear accelerator has been developed and tuned for the heavy ion accelerator facility at RISP (Rare Isotope Science Project). The RISP RFQ has the 81.25 MHz operational frequency and a four-vane structure for a continuous wave (CW) operation despite the fabrication difficulties of the huge cavity due to the brazing technology. The cavity is inherently insensitive to perturbations due to low frequency and a short cavity length. The linearly increasing profile of the inter-vane voltage has been tuned for all quadrants through not only the movable slug tuners but also the modification of the end plate. In this study, a low-frequency RFQ with a novel ramped field profile has been tuned and the commissioning tests have been conducted with a new tuning method compatible with the modification of end region geometry.

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