

## COAXIAL BALL SCREW TUNER FOR ICHIRO 9-CELL CAVITY

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### *Abstract*

The ICHIRO 9-cell cavity design such a high gradient (45 MV/m) pointed out hard requirement on the tuner system. To achieve the required high speed, stiffening and tunability range, we designed a tuning system based on a coaxial screw system. The slow mechanical tuning is performed by coaxial screw, which is driven by pulse motor located near inside of the vacuum vessel. The pulse motor drives a worm and worm wheel mounted on the coaxial ball screw. The advantage to use the worm and worm wheel is to reduce driving power of the screw rotating force and the higher tunability. Another tuner is required to tune the effects of so called Lorentz de-tuning. As a first mechanical tuner, PIEZO actuator gives directly rotating force to the ball screw. PIEZO is placed on room temperature environment in the vacuum vessel. In this mechanical design, thermal flow rate to 100K from 2K was strongly considered.

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