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## Multi-megahertz induction cell driver for the next generation compact hadron therapy system

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The fast cyclic synchrotron (IS) using the principle of induced acceleration was demonstrated at KEK in 2013 and is now being studied for application to a compact hadron therapy driver (ESCORT) capable of energy swept beam extraction. **The ESCORT has the feature of avoiding instability caused by synchro-beta coupling by accelerating ions using a true variable amplitude pulse voltage that is extracted from the time varying DC voltage, rather than an equivalent variable voltage pulse system using a pulse density modulation method as used in the existing IS (KEK-DA). Furthermore, the accelerator cell driver is designed to be more compact by generating pulses at several MHz, whereas in the past, the upper frequency limit of the accelerator cell driver was set at about 1 MHz\*\***, and multiple accelerator cells were used adapted for higher orbital frequencies. These innovations are made possible by the latest advances in power device and power electronics technology. This paper describes the development of an inductive acceleration cell driver for application to ESCORT.

### Funding Agency

### Footnotes

- K. Takayama et al., Phys. Rev. ST-AB 17, 010101 (2014). \*\* Leo Kwee Wah et al., Phys. Rev. Accel. and Beams 19, 042802 (2016). \*\*\* K. Takayama et al., Phys. Rev. Accelerators and Beams 24, 011601 (2021). \*\*\*\*Y Liu et al., submitted to Rev. of Sci. Instruments (2022).

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Yes

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