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Simulation of muti-harmonic adaptive feedforward control for magnetic alloy cavity

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The upgrade plan of the China Spallation Neutron Source aims to enhance the beam power from 100 kW to 500 kW. To achieve this, the plan involves incorporating three new magnetic alloy cavities while maintaining the existing system to enable double harmonic acceleration. As a consequence of the increased current intensity, the beam loading effect will be significantly amplified in multiple harmonics, presenting a considerable challenge for the low-level RF control system of the magnetic alloy cavity. To address this challenge, an adaptive feedforward algorithm has been developed to enable optimal control in multiple harmonics. In addition, comprehensive simulations of the algorithm have been successfully conducted to validate its effectiveness.

Keyword

muti-harmonic control, adaptive feedforward control, magnetic alloy cavity

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