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Newest Piezo-Actuators for High Dynamic Rate Operation (10^7+8^7)

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Abstract:

To compensate for SRF cavity Lorentz Force Detuning fast/piezo actuator must operate at high amplitude and high dynamic rate. The piezo-actuator when operated inside insulate vacuum environment with pulses of large amplitude could be overheated quickly. Uncontrollable increase of the piezo actuator temperature could lead to the failure of the actuator, as reported in many papers.

Removing heat from piezo-ceramic when it is operated inside insulate vacuum environment complicated task that newer addressed previously. FNAL and PI team developed newest high dynamic rate (HDR) piezo-ceramic actuator that has unique way to remove heat from piezo.

Design of the newest actuator-actuators and preliminary test results will be presented.

This new HDR piezo-actuators could significantly increase reliability of the fast tuners for compensation of Lorentz Force detuning in the SRF Linacs that operated in RF-pulse mode.

Provocative topic:

What is reliability/ longevity of the piezo-tuners that deployed in recent SRF linacs?

What are the reasons that practically every modern SRF accelerator system that built recently has piezo-tuners?

But not many facility is running piezo-actuators 24/7 ?

Low reliability of the piezo? And the risk that piezo-stack could fail prevent it from actively operate fast/piezo tuners for High Dynamic Rate operation?

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Session Classification: Working Group Session