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Active Disturbance Rejection Control of Superconducting Cavities

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In the past few years, the NSCL has tested several techniques to reduce the effects of microphonics on super-conducting cavities. One of these techniques is to replace the standard RF PID control with an ADRC (active disturbance rejection control). This type of controller uses a state observer to estimate the portion of the cavity feedback caused by disturbances. The control is then split into two parts, and the disturbances are directly cancelled using the RF drive, allowing higher gain to be used to control the cavity.

The performance of the LLRF controller showed significant improvement when using ADRC compared to the PID controller. This talk will show the control statistics for both types of control used at NSCL. The talk will also cover some implementation challenges in implementing ADRC on the NSCL LLRF systems.

Primary authors: USHER, Nathan (National Superconducting Cyclotron Laboratory); ZHAO, Shen (Cleveland State University)

Presenter: USHER, Nathan (National Superconducting Cyclotron Laboratory)

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