Contribution ID: **2089** Contribution code: **THPA116** Type: **Poster Presentation**

# Initial experimental test of a modified ADRC algorithm for microphonics reduction

*Thursday 11 May 2023 16:30 (2 hours)*

In this article, the results obtained with a new designing approach for the active disturbance rejection control (ADRC) algorithm are presented, where loop shaping techniques are used in order to stabilize the controller and make it more resilient to delay. The objective of this work is to describe the experiment performed to test the microphonic reduction capability of the modified ADRC (MADRC), as well as to present and discuss the results obtained on the test system, which is a 9-cell super conducting radio frequency (SRF) cavity.

This is in respond to the need of a precise microphonics control in SRF cavities that are operated with high quality factors. Due to the stochastic nature of microphonics and the relatively large delay of piezoelectric actuators, feedback controllers tend to destabilize the system before an acceptable control bandwidth is obtained and, therefore, are quite limited. The objective of this new approach is to modify the basic structure of the ADRC in order to enable the study of its frequency response and then make it more robust via loop shaping techniques.

## Funding Agency

## Footnotes

## I have read and accept the Privacy Policy Statement

Yes

**Primary authors:** ELEJAGA, Ander (University of the Basque Country); JUGO, Josu (University of the Basque Country); ECHEVARRIA, Pablo (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH)

**Co-authors:** USHAKOV, Andriy (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH); NEUMANN, Axel (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH)

**Presenters:** ELEJAGA, Ander (University of the Basque Country); USHAKOV, Andriy (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH); NEUMANN, Axel (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH)

**Session Classification:** Thursday Poster Session

**Track Classification:** MC6: Beam Instrumentation, Controls, Feedback and Operational Aspects: MC6.T27: Low Level RF