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Control of ideal and resistive magnetohydrodynamic instabilities in reversed field pinches with a resistive wall by sensing three components of B KARL SASSENBERG, Department of Physics, University of Tulsa, Tulsa, Oklahoma 74104, USA, ANDREW S. RICHARDSON, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, USA, DYLAN P. BRENNAN, Department of Physics, University of Tulsa, Tulsa, Oklahoma 74104, USA, JOHN FINN, Los Alamos National Laboratory, Los Alamos, New Mexico 87545, USA — Numerical studies are presented of magnetohydrodynamic instability control through sensing and proportional feedback in Reversed Field Pinches (RFPs) of all three components of the helical magnetic field perturbation $\tilde{\boldsymbol{B}}$, specifically three control parameters for three measurements. In particular, investigations of the stability of m=1 modes with sensing on the interior of the resistive wall are shown. Furthermore, the effect on mode stability with respect to the three applied control parameters compared to previous work (Phys. Plasmas vol. 17, p. 112511 (2010)) which sensed only two components of $\tilde{\boldsymbol{B}}$ at the wall is discussed. Here the third parameter is applied to the parallel field component. This could potentially lead to improved performance in current day experiments through routine access to the favored quasi-single-helicity states. While this study has focused on RFPs, it may also be possible to achieve comparable performance improvements in future tokamak experiments.

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