Abstract Submitted
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New MHD feedback control schemes using the MARTe framework in RFX-mod CHIARA PIRON, Università degli Studi di Padova, GABRIELE MANDUCHI, LIONELLO MARRELLI, PAOLO PIOVESAN, PAOLO ZANCA, Consorzio RFX — Real-time feedback control of MHD instabilities is a topic of major interest in magnetic thermonuclear fusion, since it allows to optimize a device performance even beyond its stability bounds. The stability properties of different magnetic configurations are important test benches for real-time control systems. RFX-mod, a Reversed Field Pinch experiment that can also operate as a tokamak, is a well suited device to investigate this topic. It is equipped with a sophisticated magnetic feedback system that controls MHD instabilities and error fields by means of 192 active coils and a corresponding grid of sensors. In addition, the RFX-mod control system has recently gained new potentialities thanks to the introduction of the MARTe framework and of a new CPU architecture. These capabilities allow to study new feedback algorithms relevant to both RFP and tokamak operation and to contribute to the debate on the optimal feedback strategy. This work focuses on the design of new feedback schemes. For this purpose new magnetic sensors have been explored, together with new algorithms that refine the de-aliasing computation of the radial sideband harmonics. The comparison of different sensor and feedback strategy performance is described in both RFP and tokamak experiments.

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