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A Technique for the Estimation of the Wall Diffusion Time LORENZO FRASSINETTI, RICHARD FRIDSTROM, ERIK OLOFSSON, AGUNG CHRIS SETIADI, PER R. BRUNSELL, Royal Institute of Technology (KTH), Stockholm, Sweden, FRANCESCO VOLPE, Columbia University, New York, NY, USA, JAMES R. DRAKE, Royal Institute of Technology (KTH), Stockholm, Sweden — Feedback systems are important tools for an advanced control of the MHD instabilities in fusion plasmas, both for the suppression of undesired modes, such as RWMs, and for the generation of external perturbations for ELM suppression. A good knowledge of the diffusion time through the machine wall of each external harmonics is necessary for reaching optimal performances of the feedback algorithms. A correct theoretical estimation is not easy due the presence of three-dimensional mechanical structures in the devices, such as shell cuts and external conductive structures that need to be considered. Identification of differences in the vertical and horizontal diffusion time are not simple from a theoretical point of view. This work will present a relatively simple technique to experimentally estimate the diffusion time for each harmonic. The technique is based on the generation of rotating external magnetic perturbations in vacuum and on the quantification of the wall screening from the measured field inside the wall. The technique will be able to quantify possible differences among the horizontal and vertical diffusion time. In the final part of the work, the comparison with the results obtained with a closed-loop identification algorithm of the machine plant will be discussed.

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