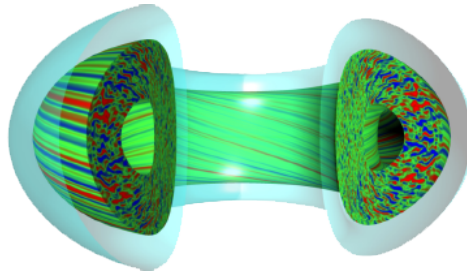


# 4th IAEA Technical Meeting on Fusion Data Processing, Validation and Analysis



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## ASSESSING PHASE AND AMPLITUDE INFLUENCE IN SYNCHRONIZATION EXPERIMENTS

*Thursday, December 2, 2021 2:20 PM (15 minutes)*

The next generation of Tokamaks and the future reactor will be operated relying much more on feedback control than present day machines. The control of macroscopic instabilities, such as Sawteeth and ELMs, will be essential. In this perspective, various pacing experiments have been indeed successfully carried out in many devices in the framework of scenario optimisation. Unfortunately, many details of their interactions with the plasma remain poorly understood, in particular the assessment of the relative importance of phase and amplitude in frequency synchronization. A data analysis methodology for investigating the details of pacing experiments is described in detail. The technique is based on the wavelet decomposition of the signals and information theoretic indicators, to determine the actual form of the interactions. In both JET and AUG coherent results have been obtained. The main effect, in both ELMs pacing with pellets and sawteeth synchronization with ICRH modulation, is due to the influence of the amplitude of the external perturbations. Some evidence of phase synchronization has been found, which could show the direction of future optimization of the interventions.

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