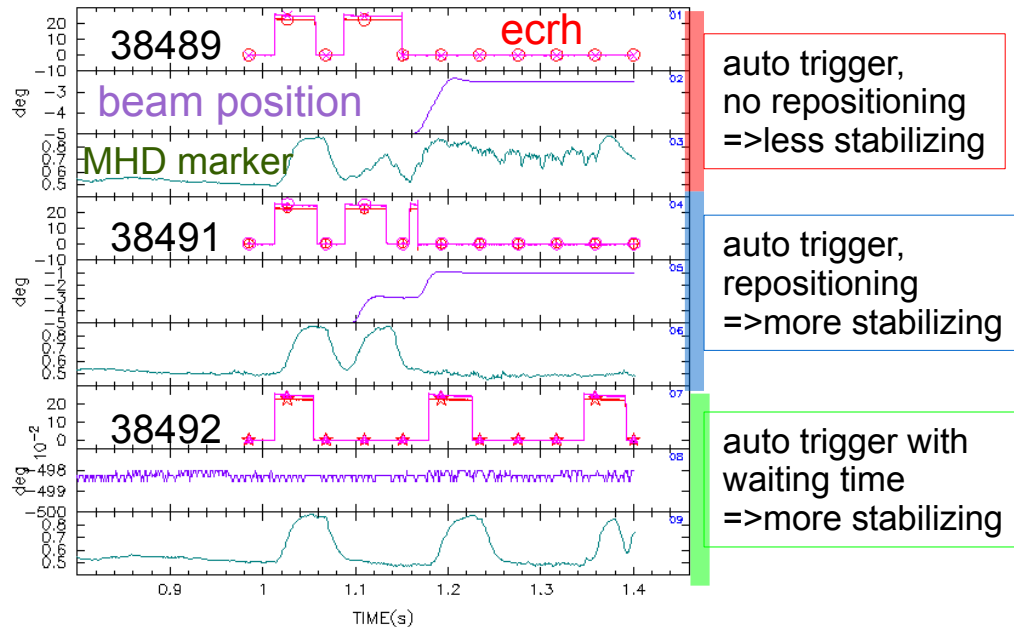
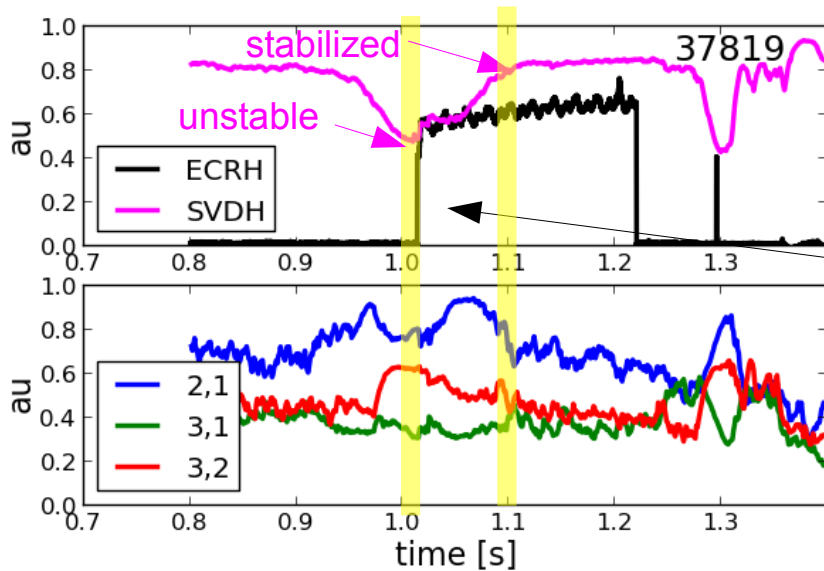


Experiments on Magneto-hydrodynamics Instabilities with ECH/ECCD in FTU

Using a Minimal Real-Time Control System.



- Minimized RT control system with MHD sensor (pick-up coils 3D array & SVD algorithm) and fast poloidal steering of ECRH ($dp/dt=0.1/30\text{msec}$)
- Early detection/mode identification/trigging and thresholding enhanced capabilities
- The sensitivity of the used MHD marker (SVDH) allows to close the control loop solely on the effect of the actuator's action with little elaboration.
- Tested on impurity injection- and density limit-triggered tearing instabilities
- The ECRH injected energy has an impact on the current profile with an extent relevant for the alignment requirements in MHD control even at relatively low power level and high density.
- This minimized set of control tools mimics some aspects of the situation of a fusion reactor where less diagnostics will be available and with reduced capabilities.