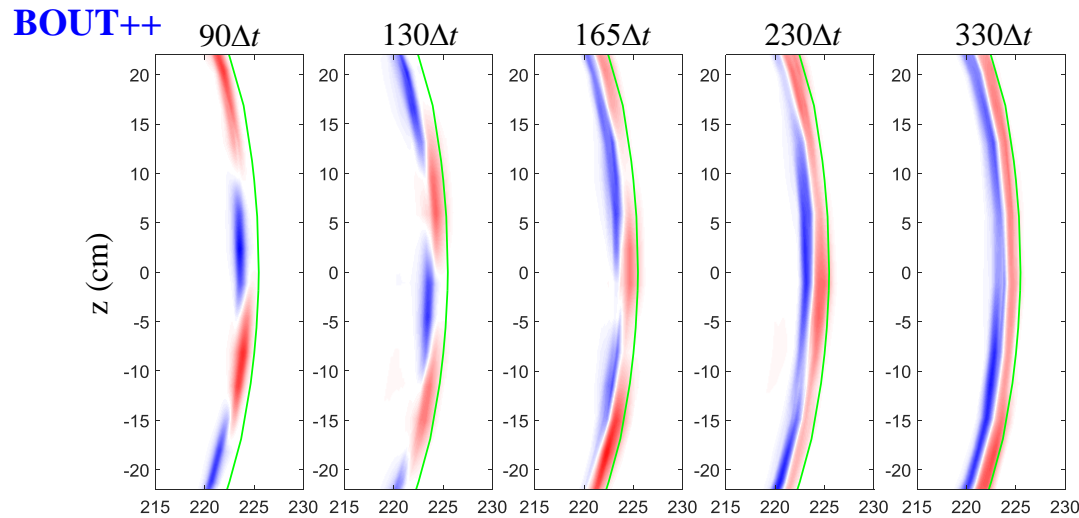


Comparative study between ECEI ELM observation in nonlinear ELM phase and nonlinear MHD simulations

- ECEI observations in nonlinear phase: ELM-crash process [G. S. Yun, POP, 2012], mode number transition during inter-ELM-crash period [J. E. Lee, NF, 2015] and multi-mode excitation [M. Kim, NF, 2015]
- Nonlinear MHD ELM simulation (BOUT++, M3D-C1 and JOREK) using equivalent plasma equilibrium (KSTAR #7328, $t \sim 4.36$ s)

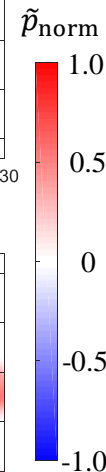
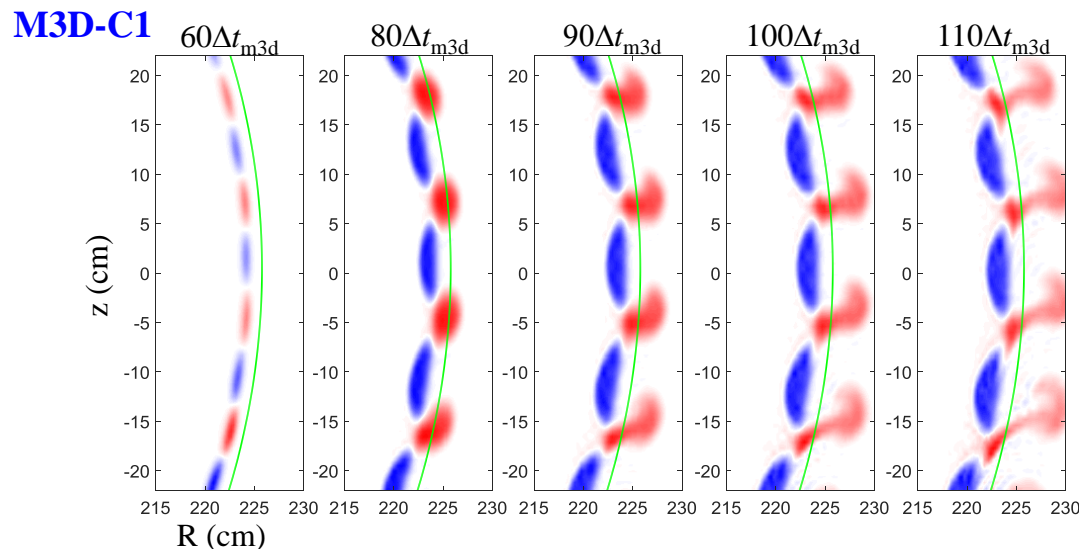


- Each frame is normalized by each absolute maximum.

- $\Delta t \sim 1.4 \times 10^{-7}$ s and $\Delta t_{m3d} \sim 2.3 \times 10^{-7}$ s

- Although the evolution of mode structures in nonlinear phase are different in each codes, there are partial agreement with ECEI observation.

- **BOUT++**: change of mode # spectrum near ELM-crash
- **M3D-C1**: heat or particle transport across LCFS
- **JOREK** (M. Bécoulet, *ibid*): mode number transition



- By improving nonlinear simulation itself and comparative study with ECEI observation, it will contribute to understand nonlinear physics of ELM.