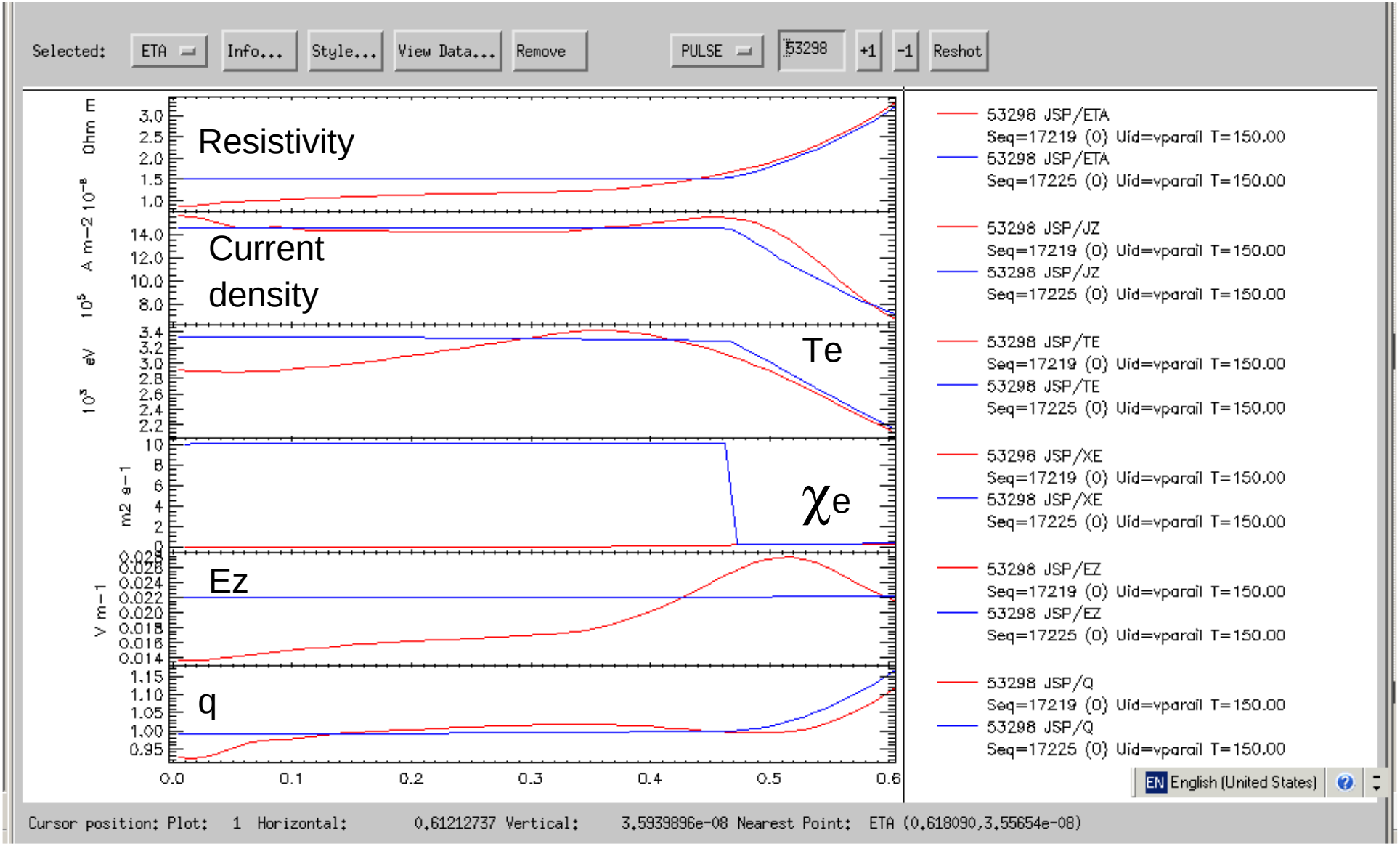
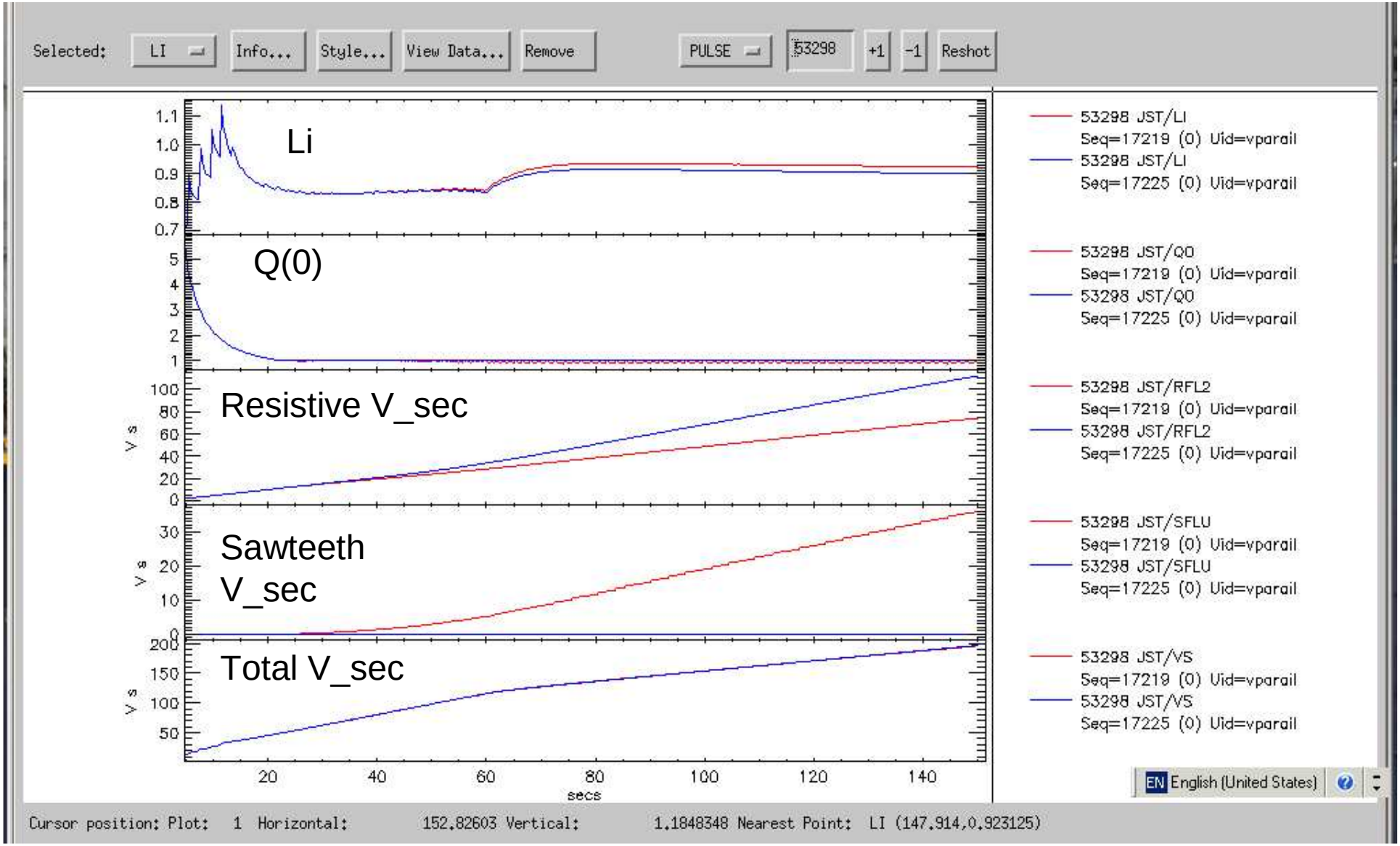
ISM report

V. Parail; P. Belo, G. Corrigan, W. Houlberg, F. Koechl, A. Loarte, G. Saibene, R. Sartori.

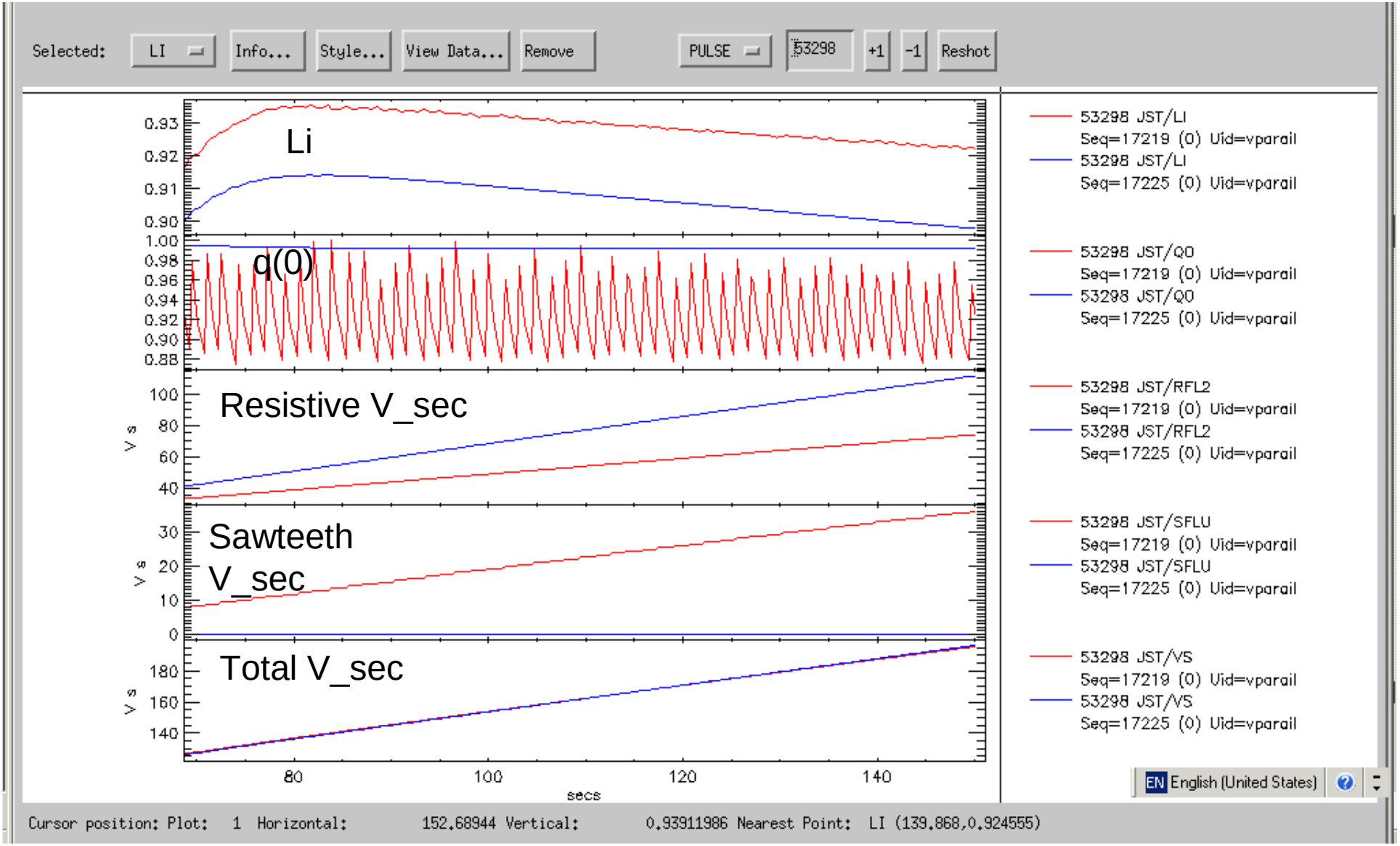
Comparison between Kadomtsev' (red) and "continuous" sawtooth reconnection model (blue) in JINTRAC (2)



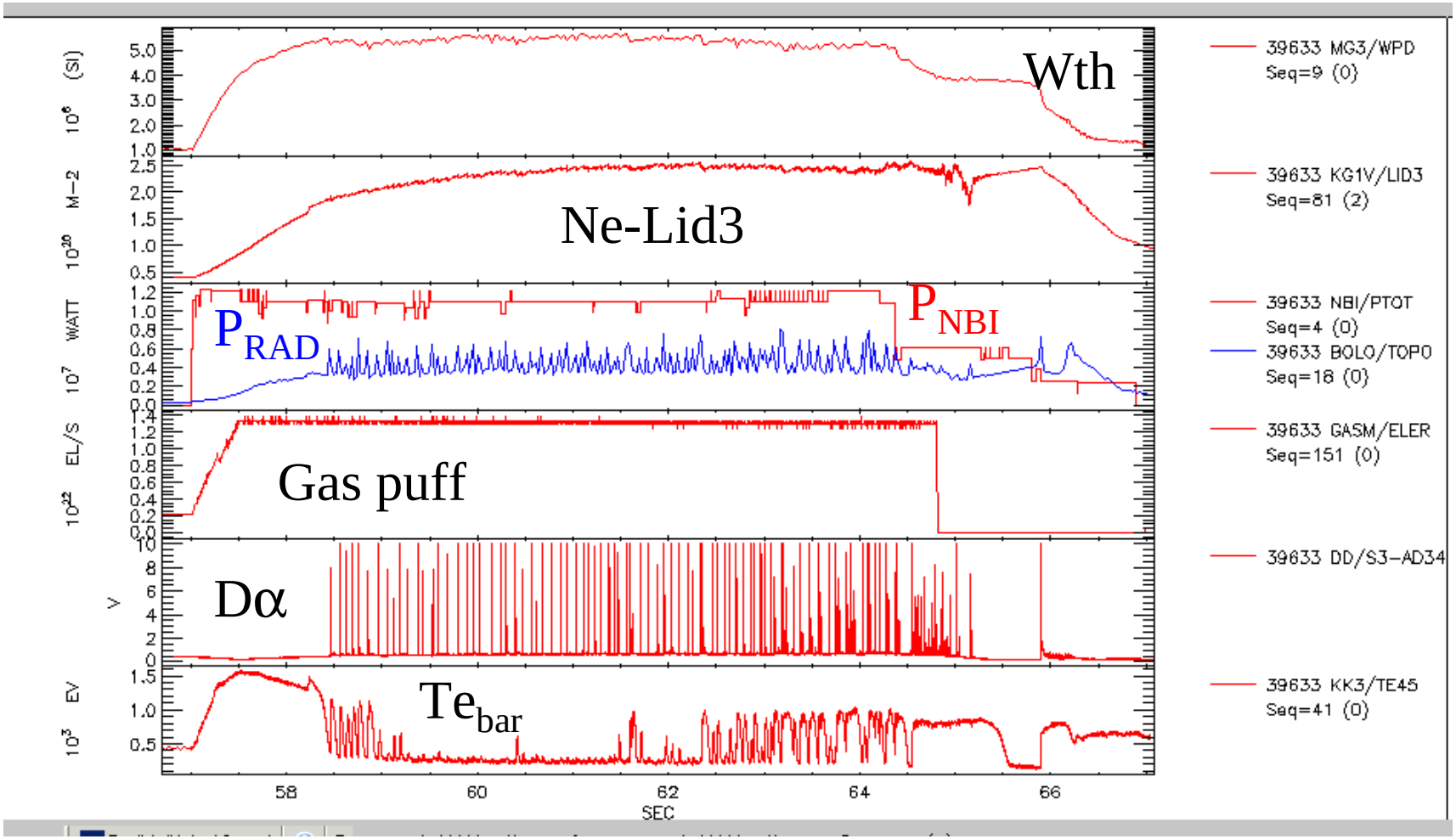
Comparison between Kadomtsev' (red) and "continuous" sawtooth reconnection model (blue) in JINTRAC (3)



Comparison between Kadomtsev' (red) and "continuous" sawtooth reconnection model (blue) in JINTRAC (4)



New results with self-consistent L-H-L transition simulation using “local” model**



Transport model for L-H and H-L transition

In *"local approach"* the code compares electron temperature at the selected magnetic surface (normally on top-of-barrier or anticipated top-of-barrier) with the "local" parametric fits for the electron temperature at L-H transition (from *E. Righi et al, Plasma Phys. Control. Fusion **42** (2000) A199–A204*):

$$T_{e,top}\,(L\text{-}H) = 0.39 n_{e,20}^{-0.64} B^{1.69} M^{-0.14} q_{95}^{-0.86}$$

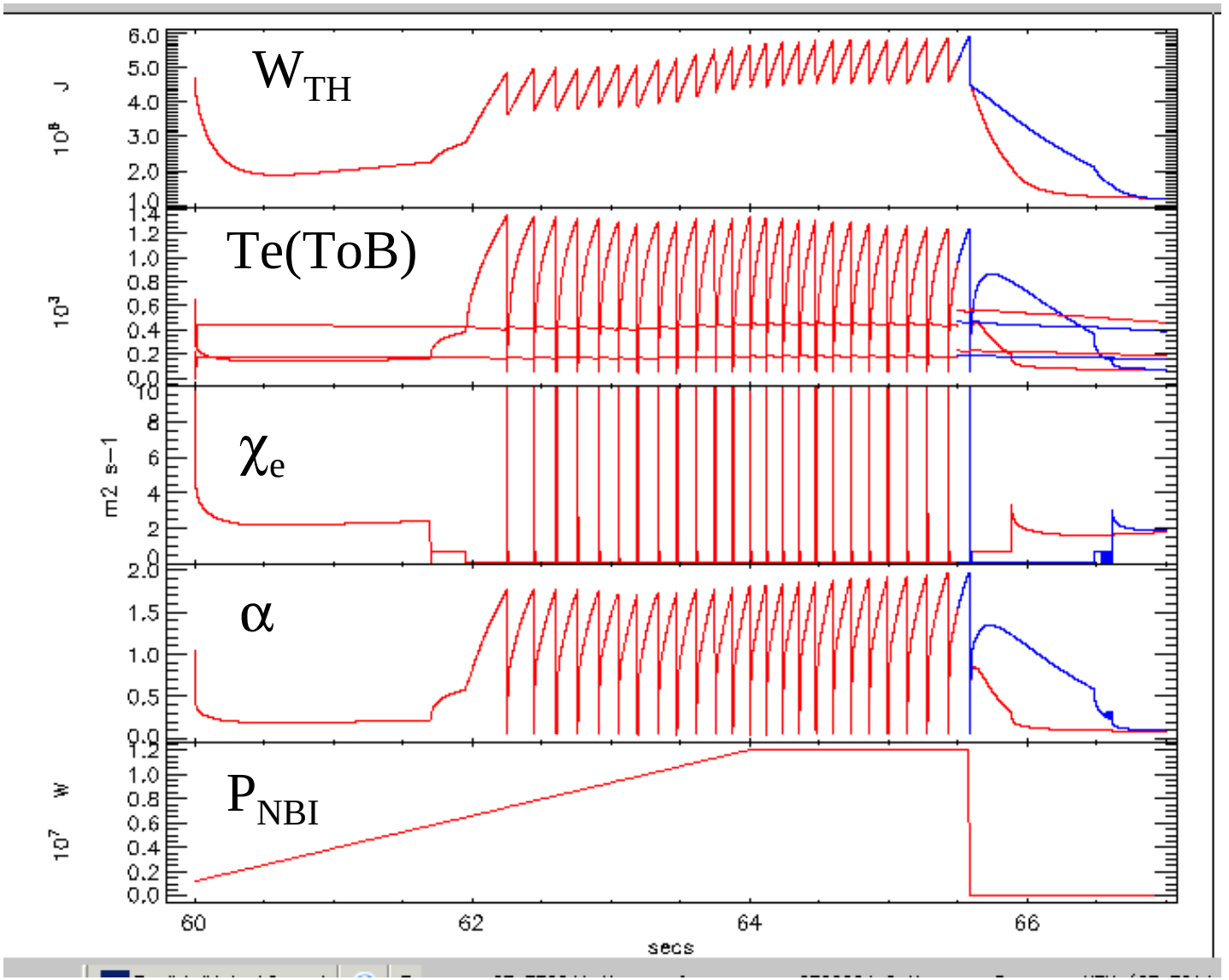
We actually use an additional adjustment parameter $\zeta \sim 1$:

$$Te,top\ (type\text{-}I) = \zeta * Te,top(L\text{-}H)$$

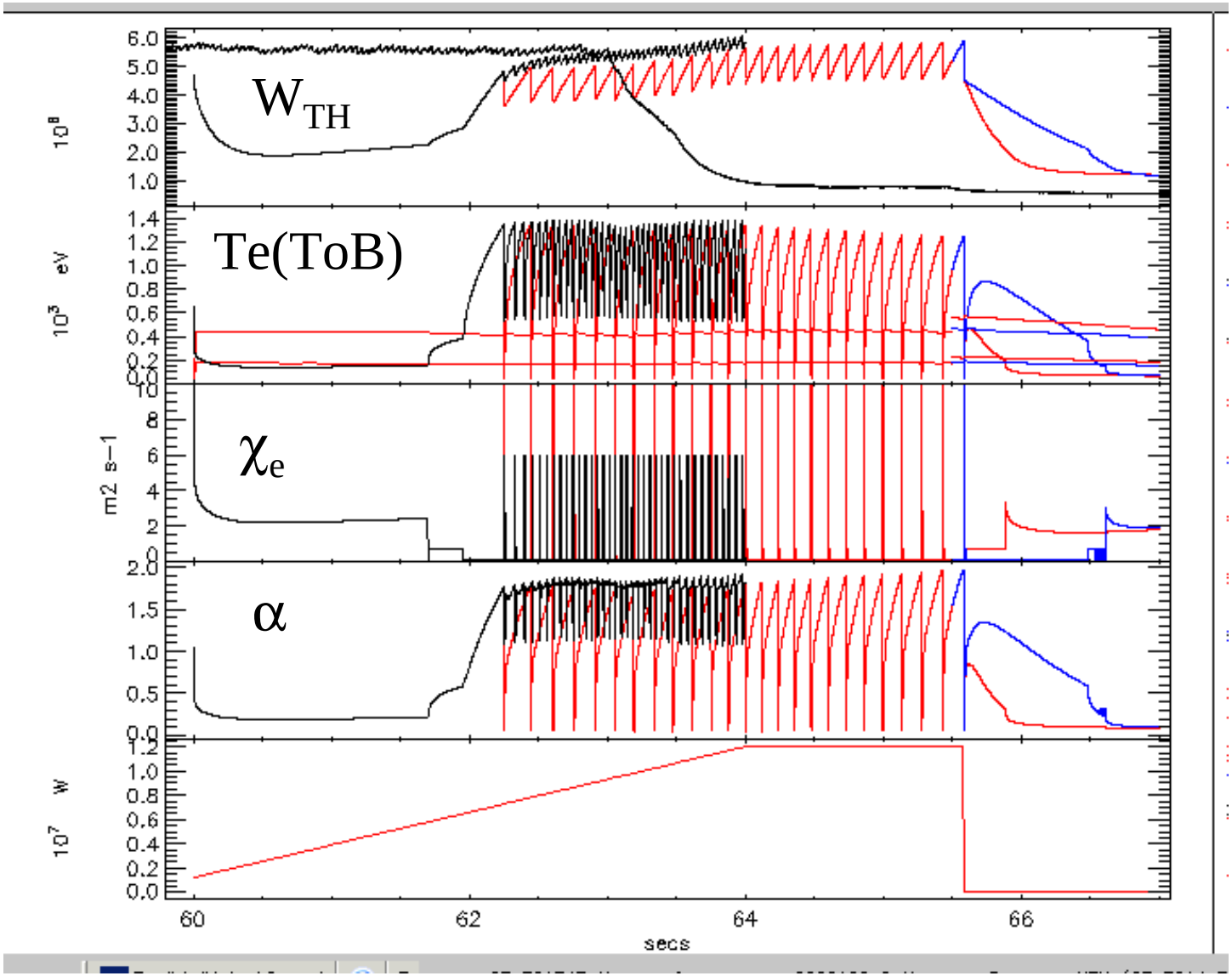
and for transition from type-III ELMs to type-I ELMs:

$$T_{e,top}\,(type\text{-}I) = \gamma_{loc} * T_{e,top}(L\text{-}H)$$

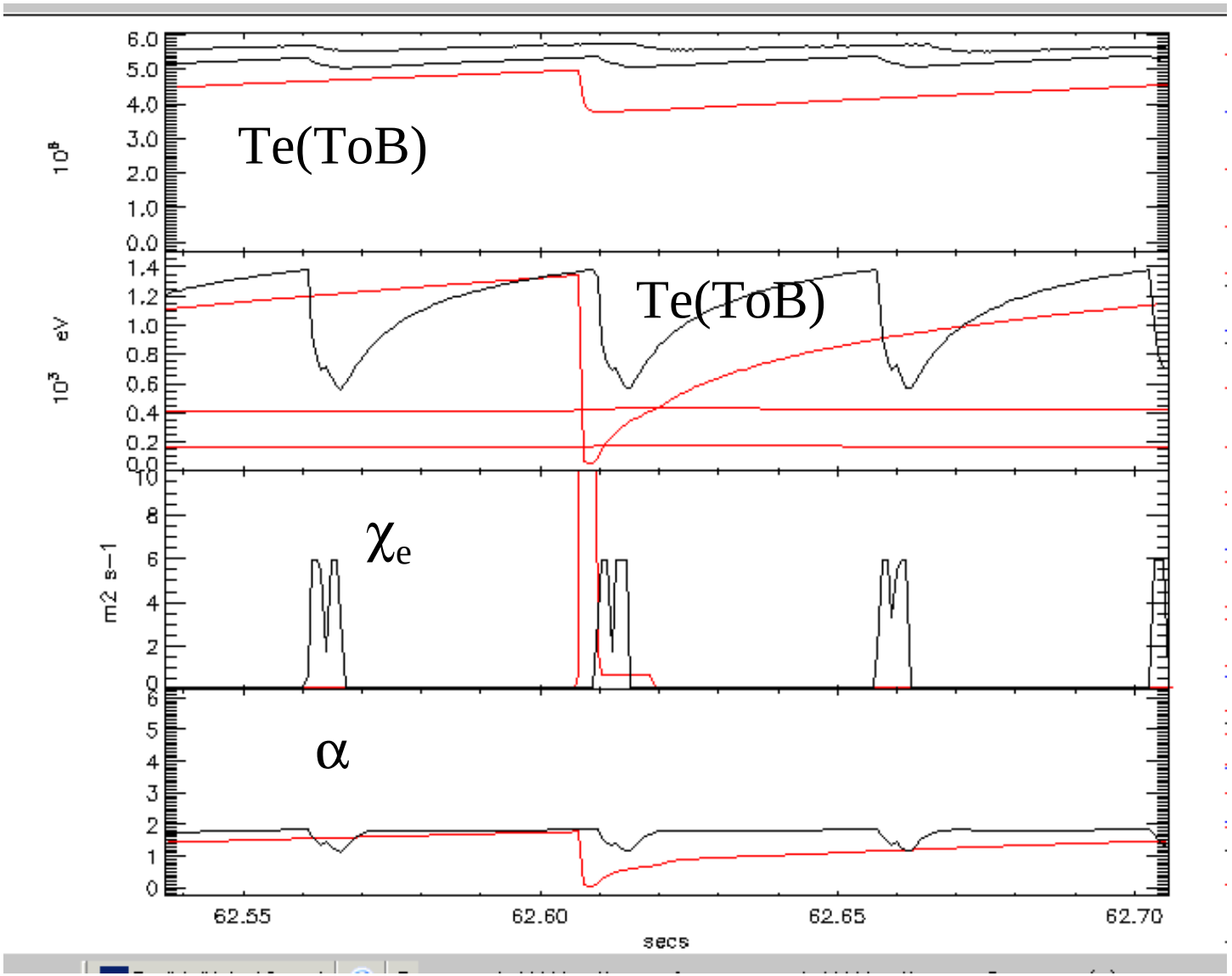
Comparison between cases with ζ=1.2 and ζ=1.5



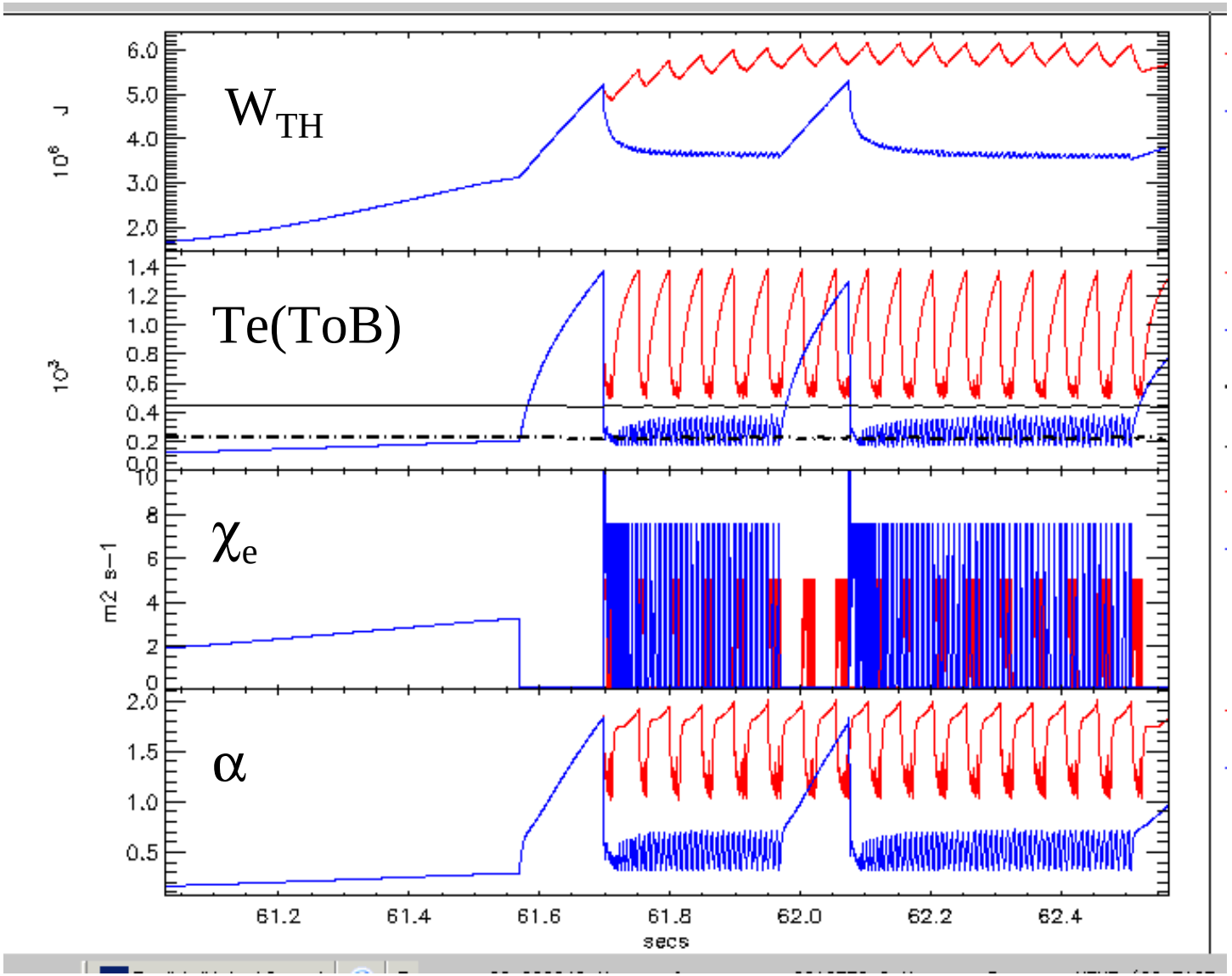
Comparison between cases with ζ=1.2 and ζ=1.5 and the case with small type-I ELM amplitude



Comparison between cases with ζ=1.2 and ζ=1.5 and the case with small type-I ELM amplitude



Comparison between cases with large type-I ELMs and small type-I ELMs



Conclusions (what we can and what we can not simulate at present)

- graduate L-H transition through type-III ELMs;
- Infrequent large type-I ELMs followed by type-III or even transient L-mode;
- Confinement improvement with small frequent type-I ELMs;
- Back H-L transition (through type-III) in case of fast loss of power and large ELMs;
- ELM-free period during graduate power ramp down;
- Density evolution was not thoroughly tested as yet;
- Simulation results are very sensitive (much more sensitive than we probably see in experiment);
- Not sure we can satisfactory simulate graduate power ramp down results (is there any hysteresis in such cases)?