Debriefing - 1.04.2019
F18: Runaway electrons

FTU Experimental Campaign 2019-C1-A

Tuesday 25/03/2019 (Early & Late)

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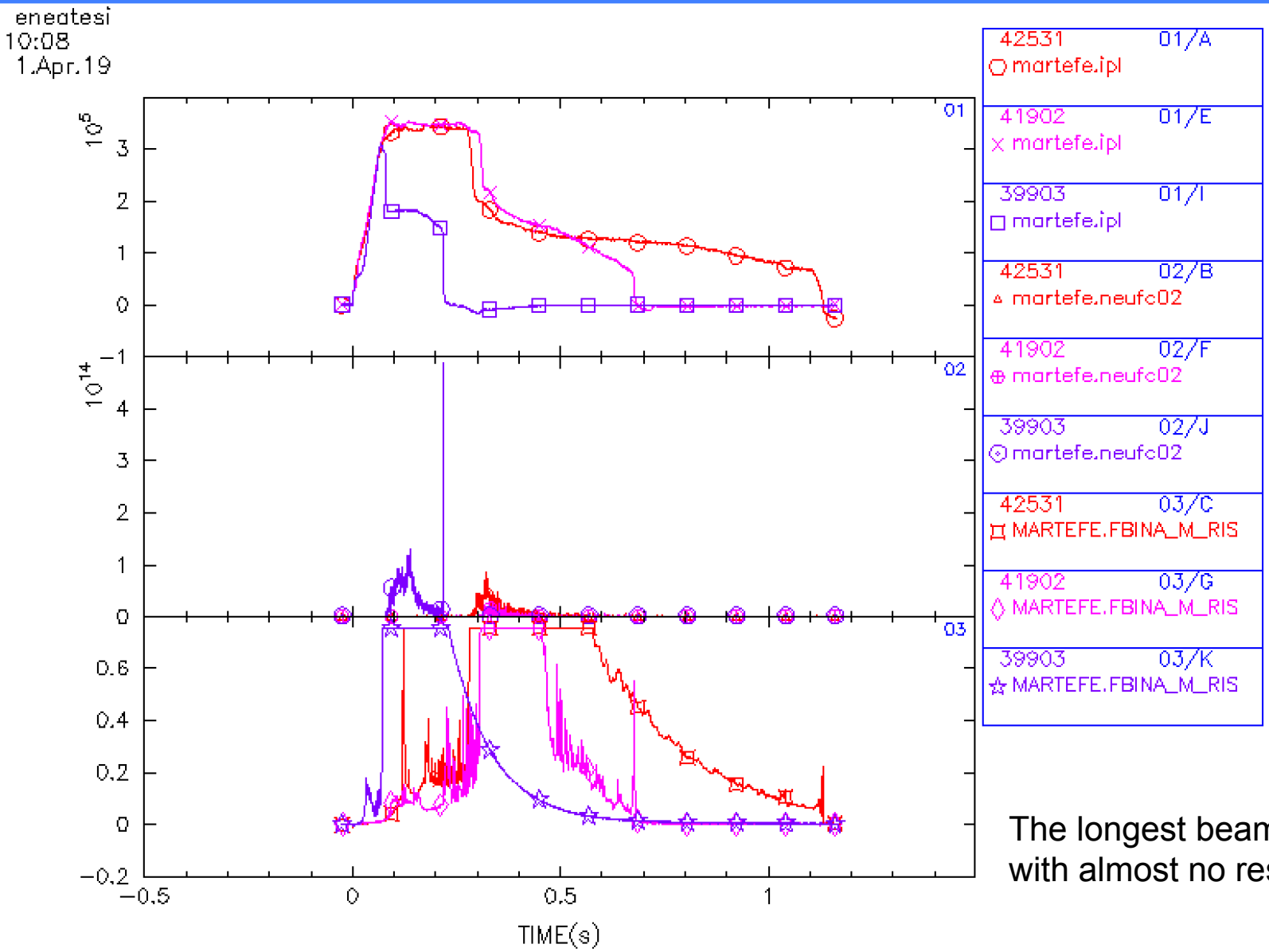
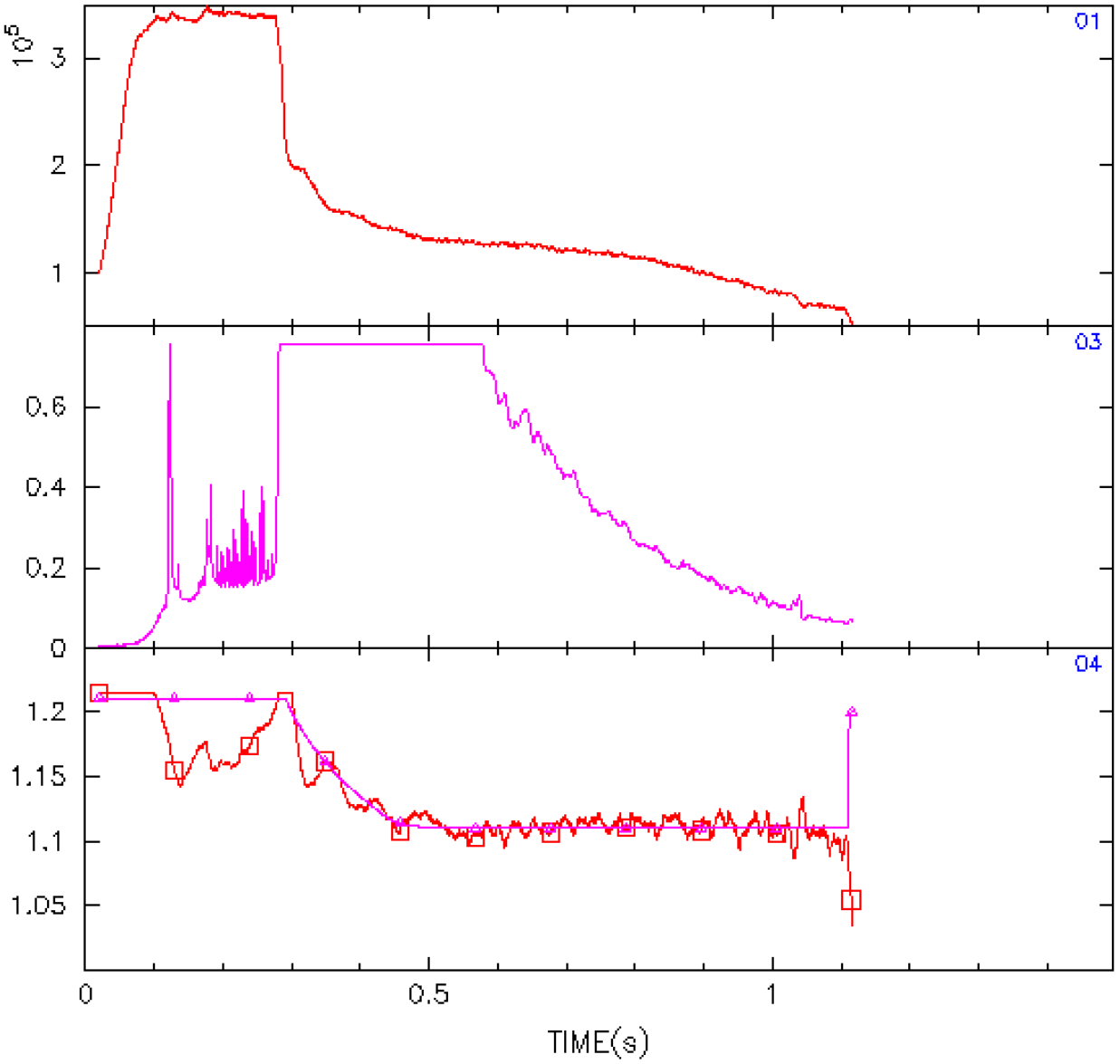
IFP ENEA Università di Roma Tor Vergata CONSORZIO RFX Ricerca Formazione Innovazione EUROfusion

RE beams (1/3)



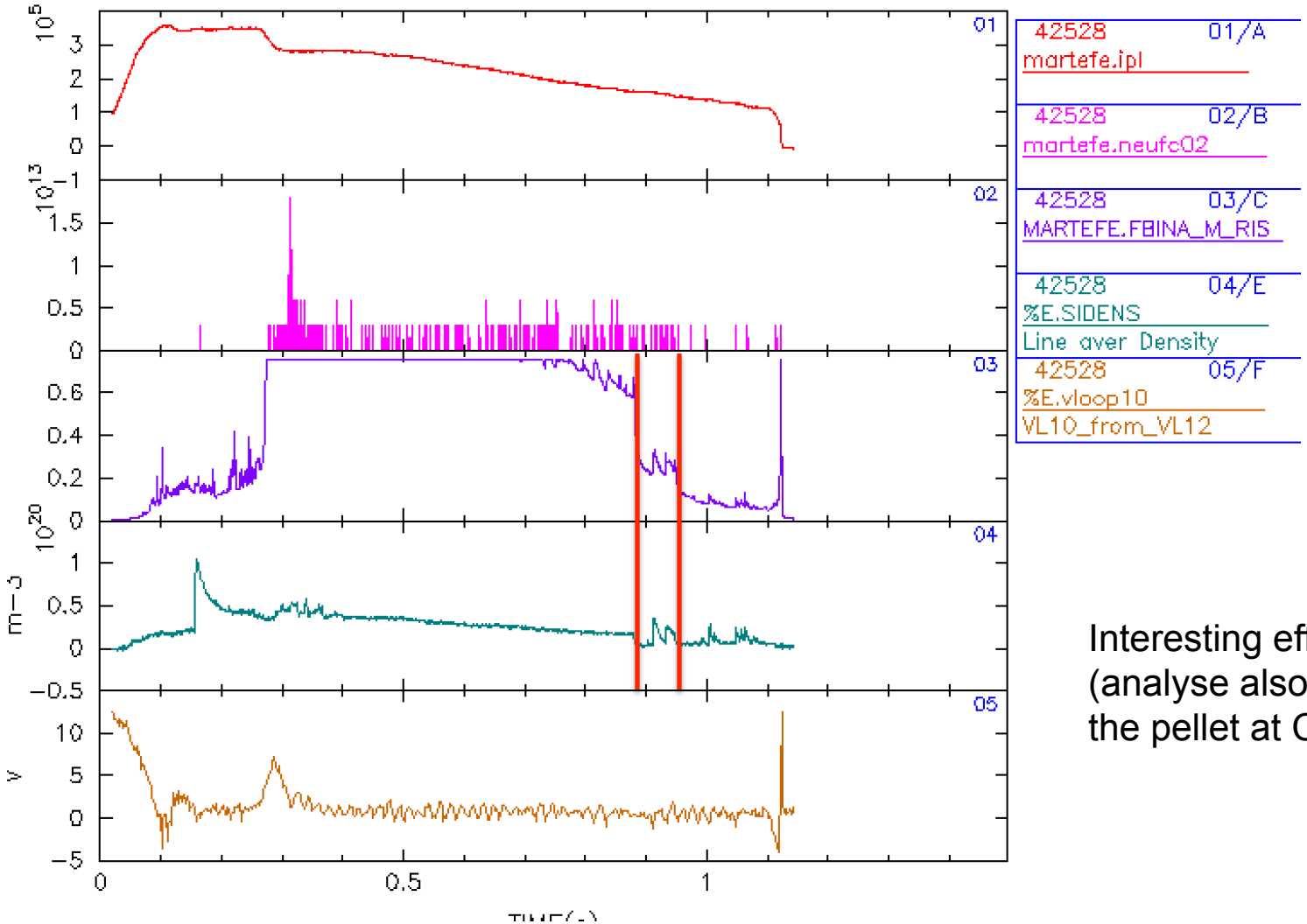
The longest beam ramped-down with almost no residual REs.

RE beams (2/3)



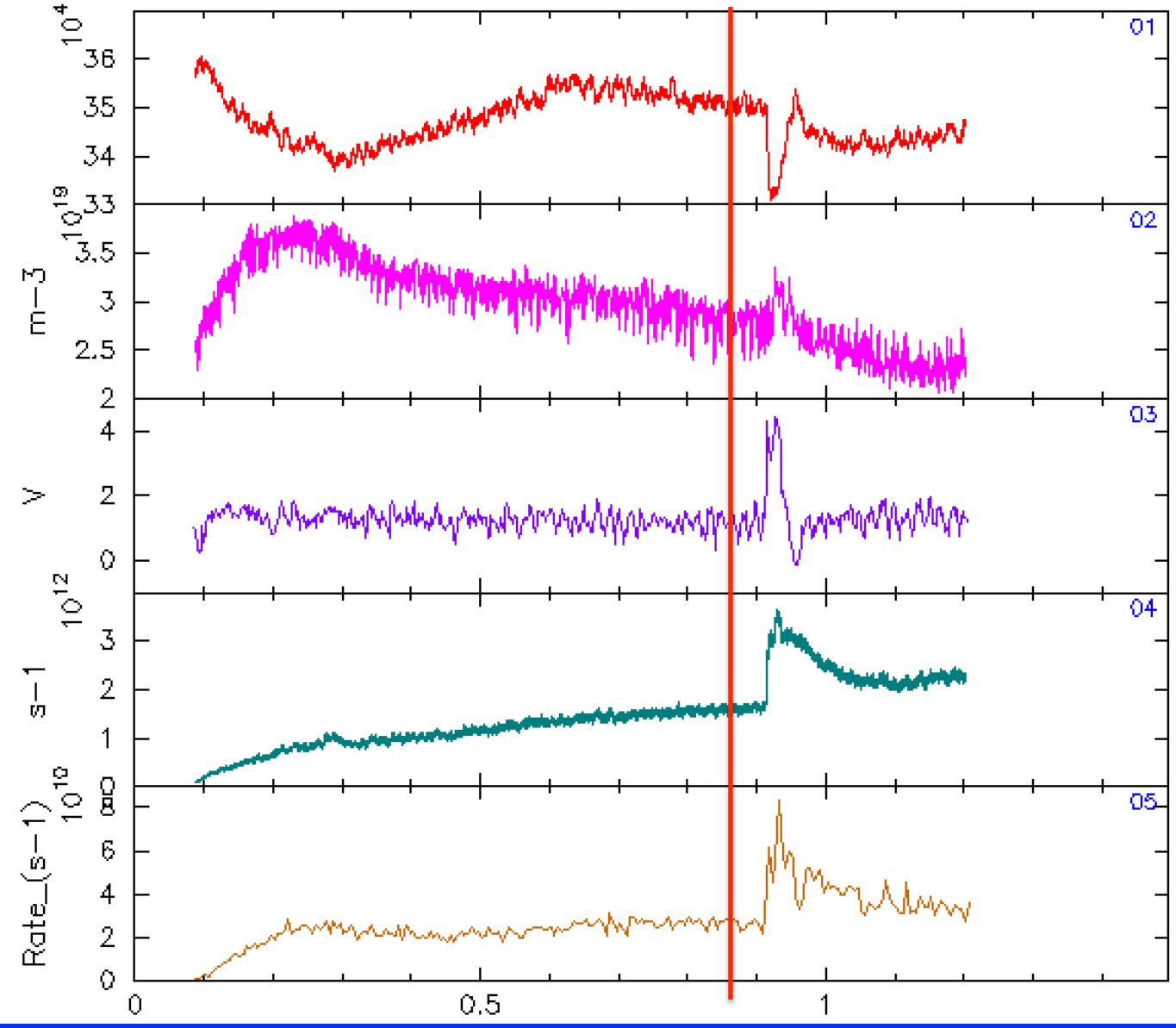
Very good position control

RE beams (3/3)



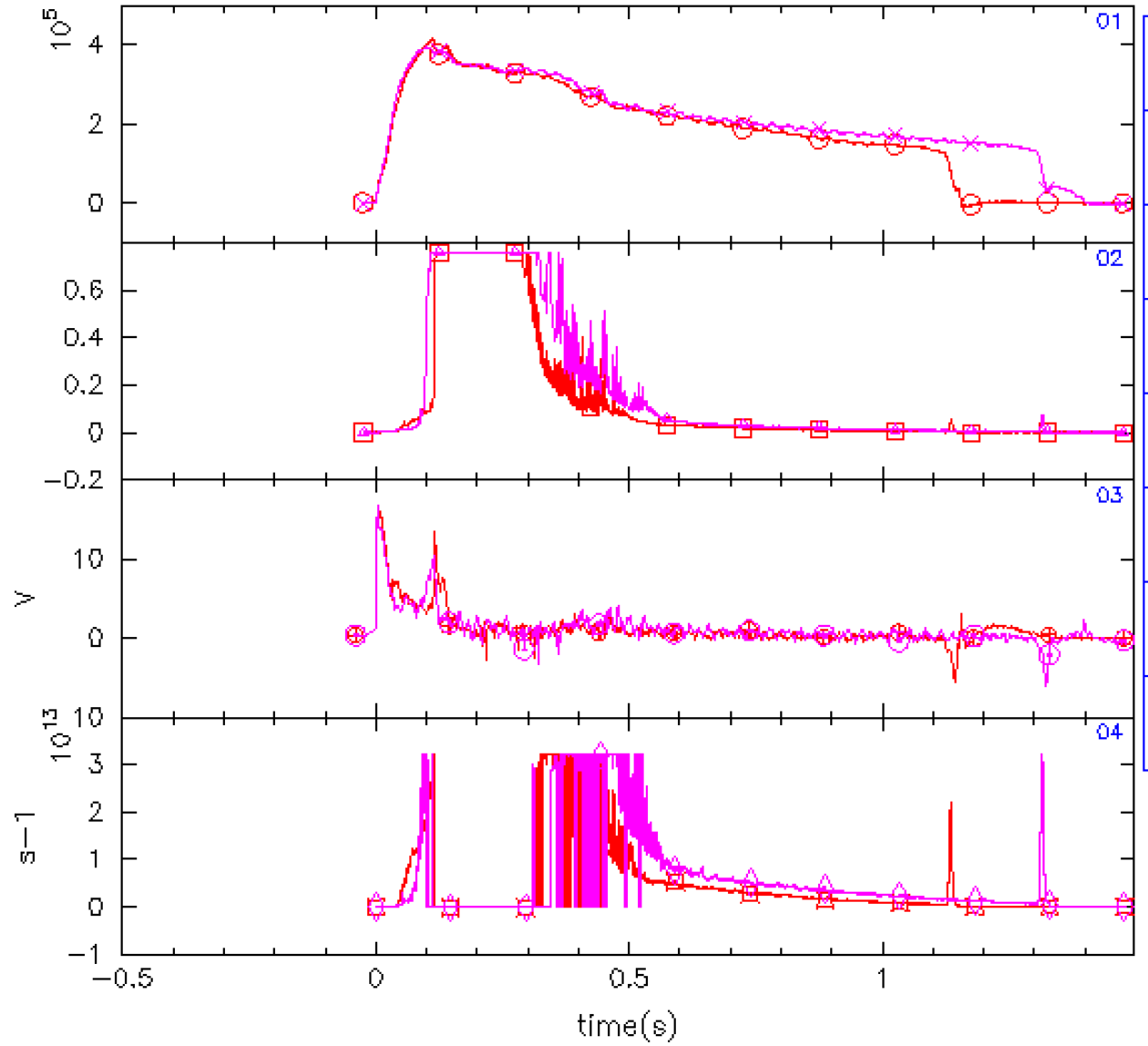
Interesting effect of pellets (analyse also the effect of the pellet at CQ)

LBO



Fe LBO:
ne213/(bf3) decreases

Soft-Stop with Vloop oscillations (a gift from F19)



Vloop oscillations: RE loss increased?

Pulse Plan (1/2)

Aim & method (write a few sentences to explain the aim and method of the proposal):

1) Analyze the effect of Vloop oscillations on a long RE beam discharge like #42531
2) Move the RE beam vertically in the vacuum vessel to assess its controllability.
3) Long discharge with density sweep to obtain necessary data to validate generation and suppression runaway dynamics codes

Reference pulse number(s): #42531 (the other two discharges for 2) and 3) have already been prepared)

Machine requirements (*list any specific requirements for B_T, I_P, heating, etc.*):

Toroidal magnetic field BT (T): 4(long) – 5.3T

Plasma current Ip (MA): 0.30 – 0.50 (0.70, possible standard recovery)

Electron density ne (1E20 m-3) 0.1 – 0.7

Diagnostic requirements (*list mandatory diagnostics or special diagnostic settings*):

HXR, FC, Interferometer, ECE, Soft-X (and temperature profiles), Da , Mirnov coils, Cherenkov, (Showb if available)

Special requirements: Ne, Poloidal Limiter 2 cm inside for all shots, allocator active in IFREF mode, Pellet injection, LBO, LONG DISCHARGE (without change the commutation resistances)

Modelling requirements (*include names of required modelling codes*):

JETTO, MARS (offline)

Pulse Plan (1/2)

Number of pulses required (*state whether they are dedicated or parasitic*):

7-10

Pulses (*briefly describe changes to be made pulse-by-pulse*):

1. Zero at 5.3T
2. Reference #42531 with Vloop oscillations in ramp-down, only one pre-programmed small pellet at 0.15s, no more pellets in ramp-down [**2 shots**, RE plateaus]
3. Recover standard 500kA, ne 0.4E20. [**1/2** (depending on residual density) shot]
4. Discharge prepared as #42531 but with Z sweep [**2 shots**, RE plateaus].
5. Recover standard 500kA, ne 0.4E20. [**1/2** (depending on residual density) shot]
6. (backup) Reference #42546, Fe on quiescent (flat-top) RE [**1** shot]
7. Zero at 4T, change on LONG DISCHARGE
8. LAST DISCHARGE: the long (3.5s) one with low prefill and gas density programmed in order to have a sweep in density and get generation and suppression of runaways [**1** shot].