

**Comments to and conclusions drawn from  
RFA measurements made  
on April 5 (Friday) and April 9 (Tuesday) 2002  
on JET, campaign C5**

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## ***Goal of the experiment:***

- looking for an experimental proof of **acceleration of particles** in front of JET LH launcher;
- utilization of **RFA** (Retarding Field Analyser) has been envisaged for observation of changes in **ion distribution function** during the LH application (located  $90^\circ$  toroidally and nearly  $90^\circ$  poloidally away of the launcher in the ion direction);

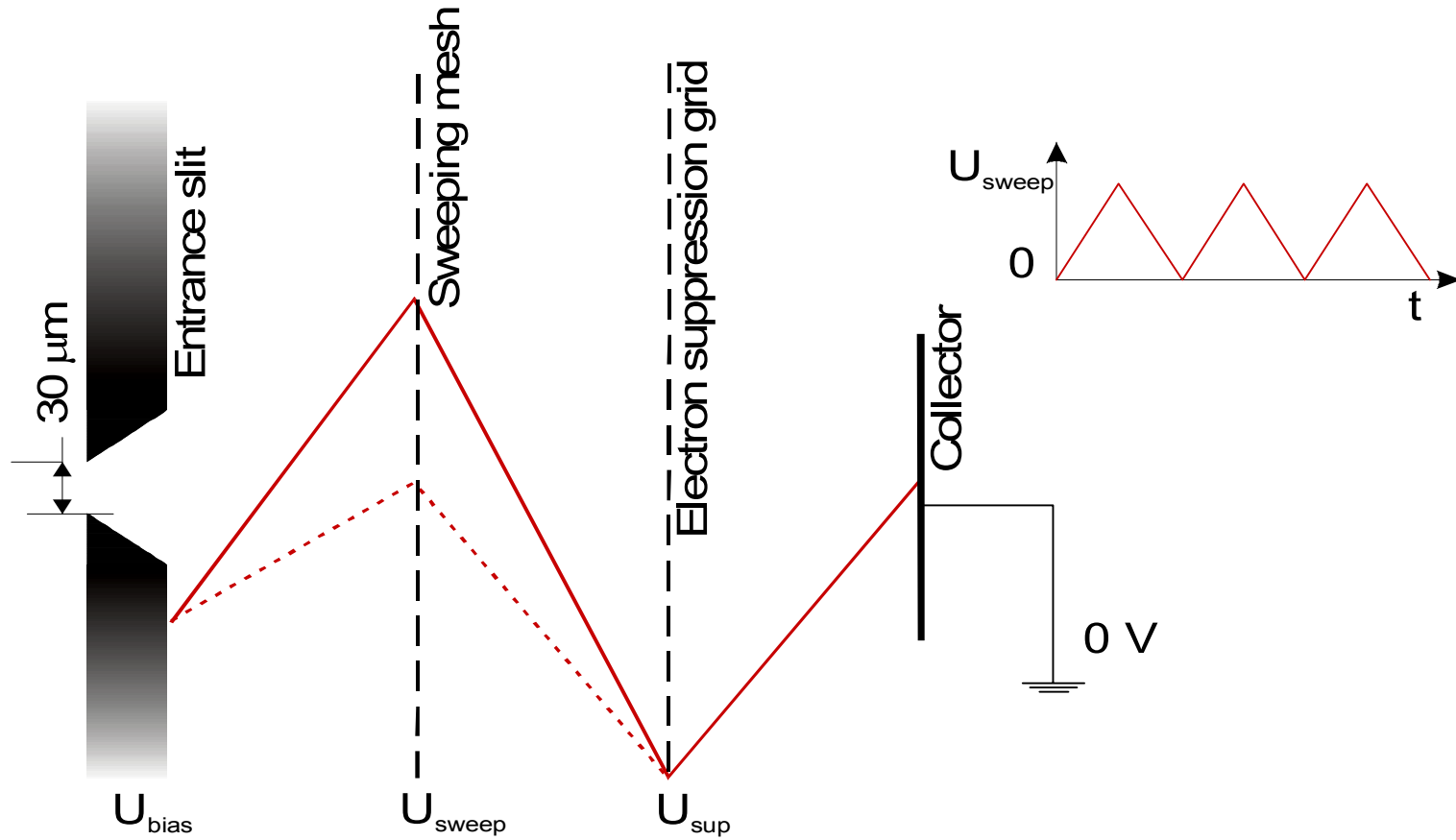
## *Idea of the experiment:*

- to find the LHW **effect if a direct magnetic connection** between the LH launcher and RFA is established (as it follows from the magnetic field lines code,  $q$  slightly above 3 is needed);
- for this reason a ramp-down of plasma current in regime with  $B_t=2.6\text{T}$  and  $I_p=2.2\text{MA}$ , starting at  $t=52\text{s}$ , has been asked and three RFA strokes at  $t=52$ ,  $54$  and  $56\text{s}$  has been performed;

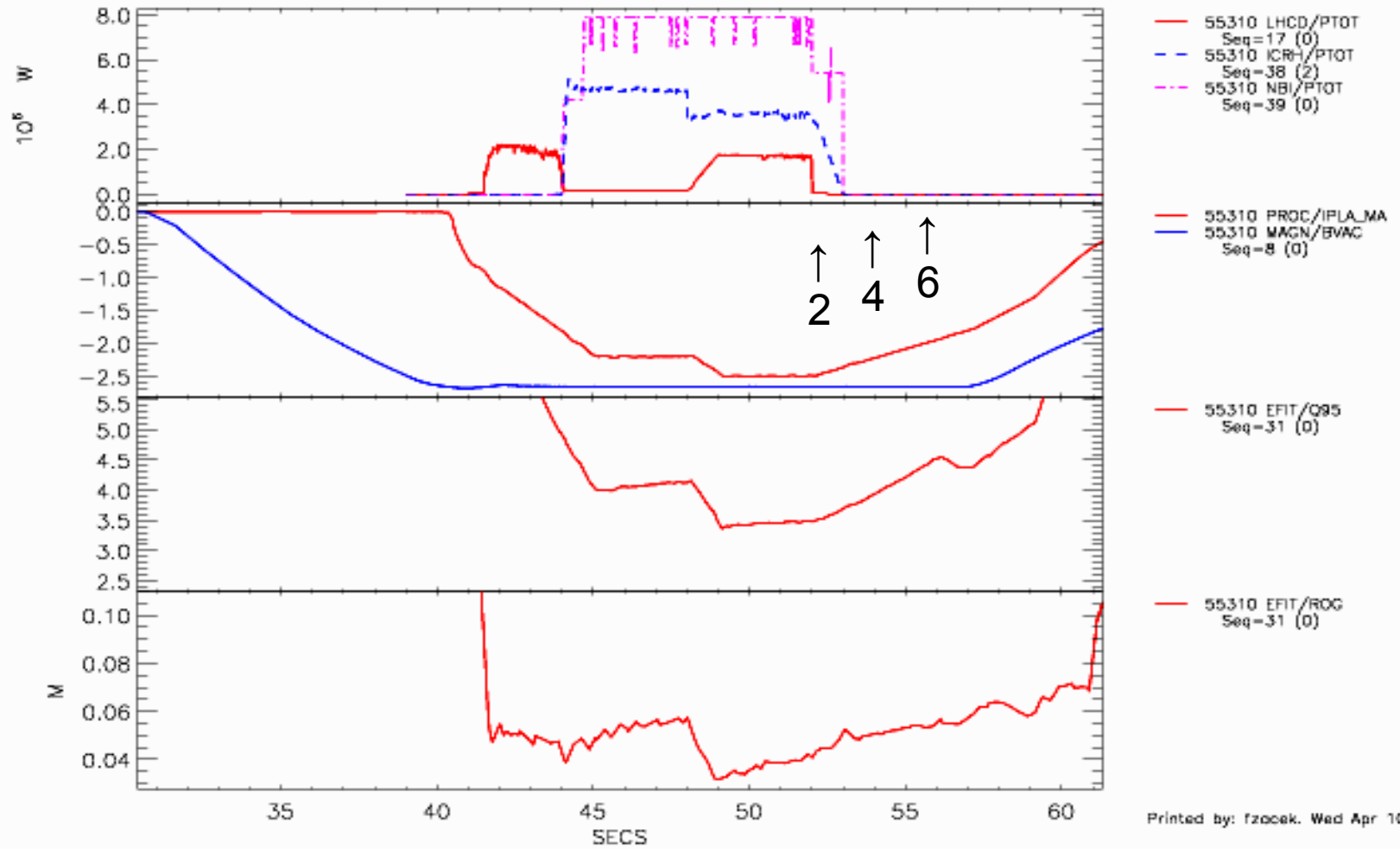
# ***Experimental set-up:***

- RFA is mounted in the Plasma Boundary Reciprocating Probe, Octant 1 (i.e. in the poloidal plane 90 degrees toroidally away from LH launcher in the ion direction) at  $R=3.25\text{m}$ ;
- vertical position of the probe is changing linearly with the time during the stroke;
- the reciprocating probe has **two identical RFA** (looking from the ion and from the electron side, respectively; the ion side should be magnetically connected with the LH grill);
- RFA voltages used (relative to the vacuum chamber):
  - triangular analysing voltage: zero to +100V (sweeping frequency 50Hz and about 10 swept RFA characteristics are visible during the probe movement)
  - secondary electron suppression mesh: -180V
  - collectors: grounded
  - biasing voltage of the entrance slit: -100V (April 5 ), -150V (April 9)
- LH power used for the RFA measurement has been lowered to a value
  - 0.6MW on April 5
  - 0.35MW on April 9

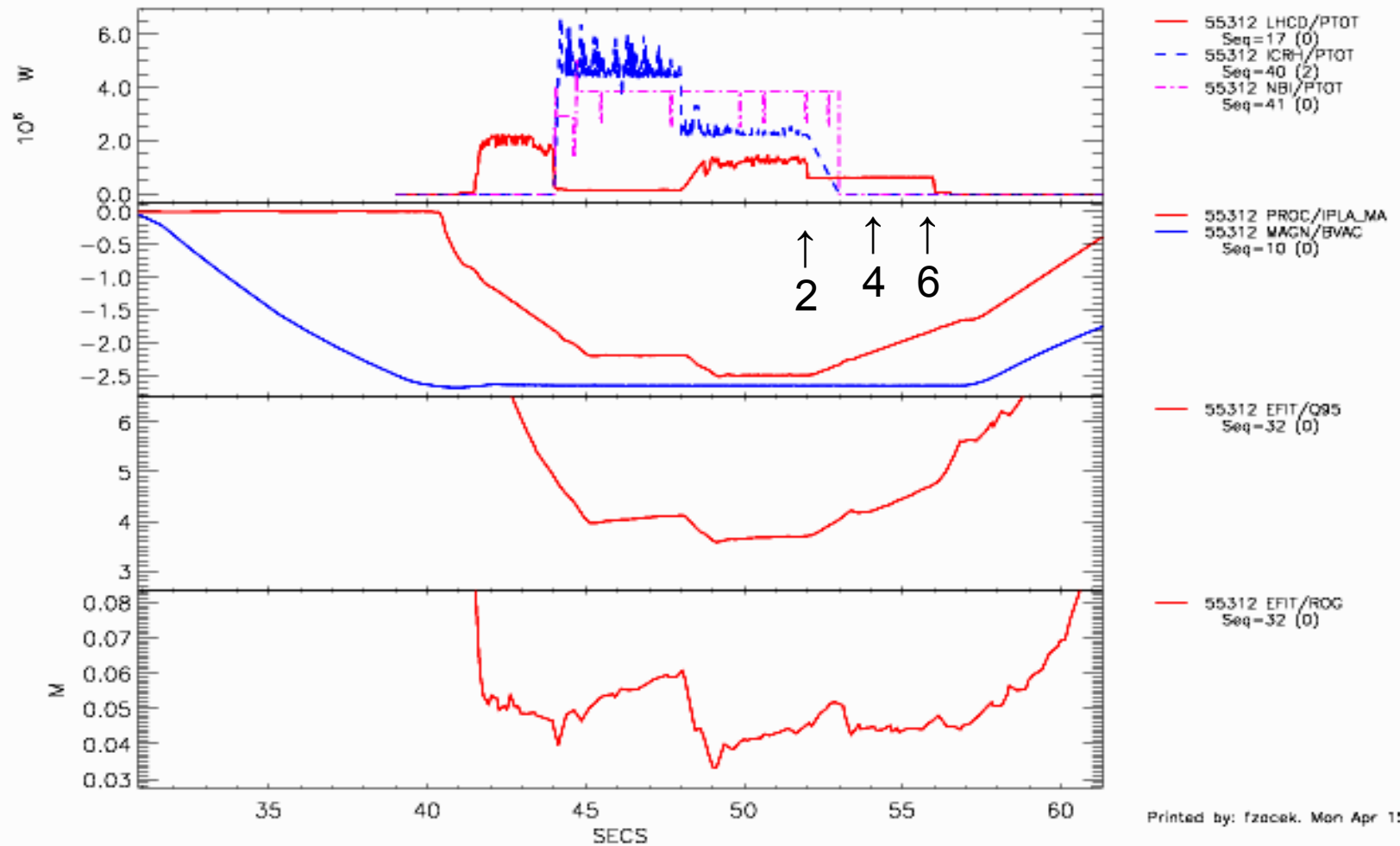
# Schematic view of the RFA

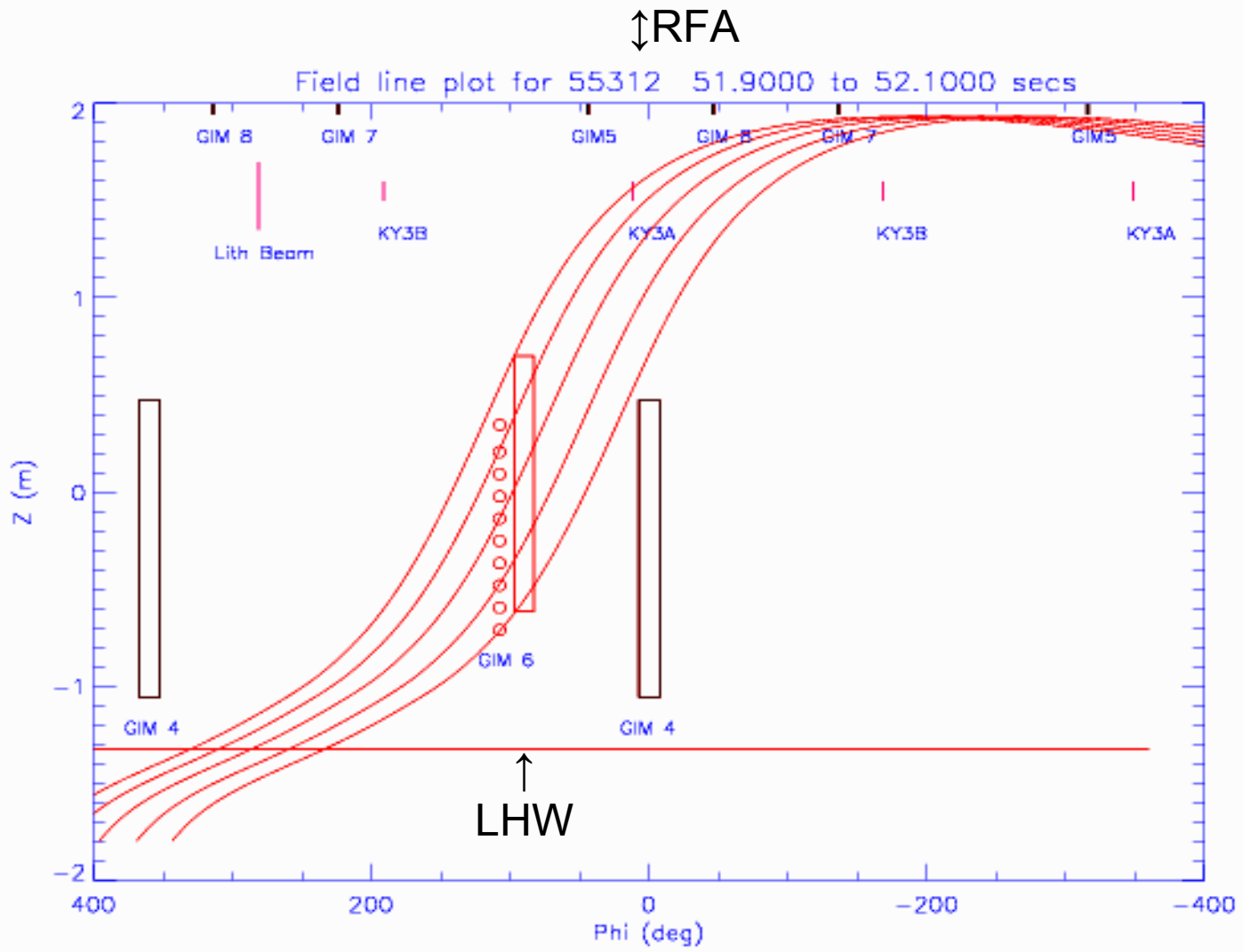


### JET Data Display 2.2

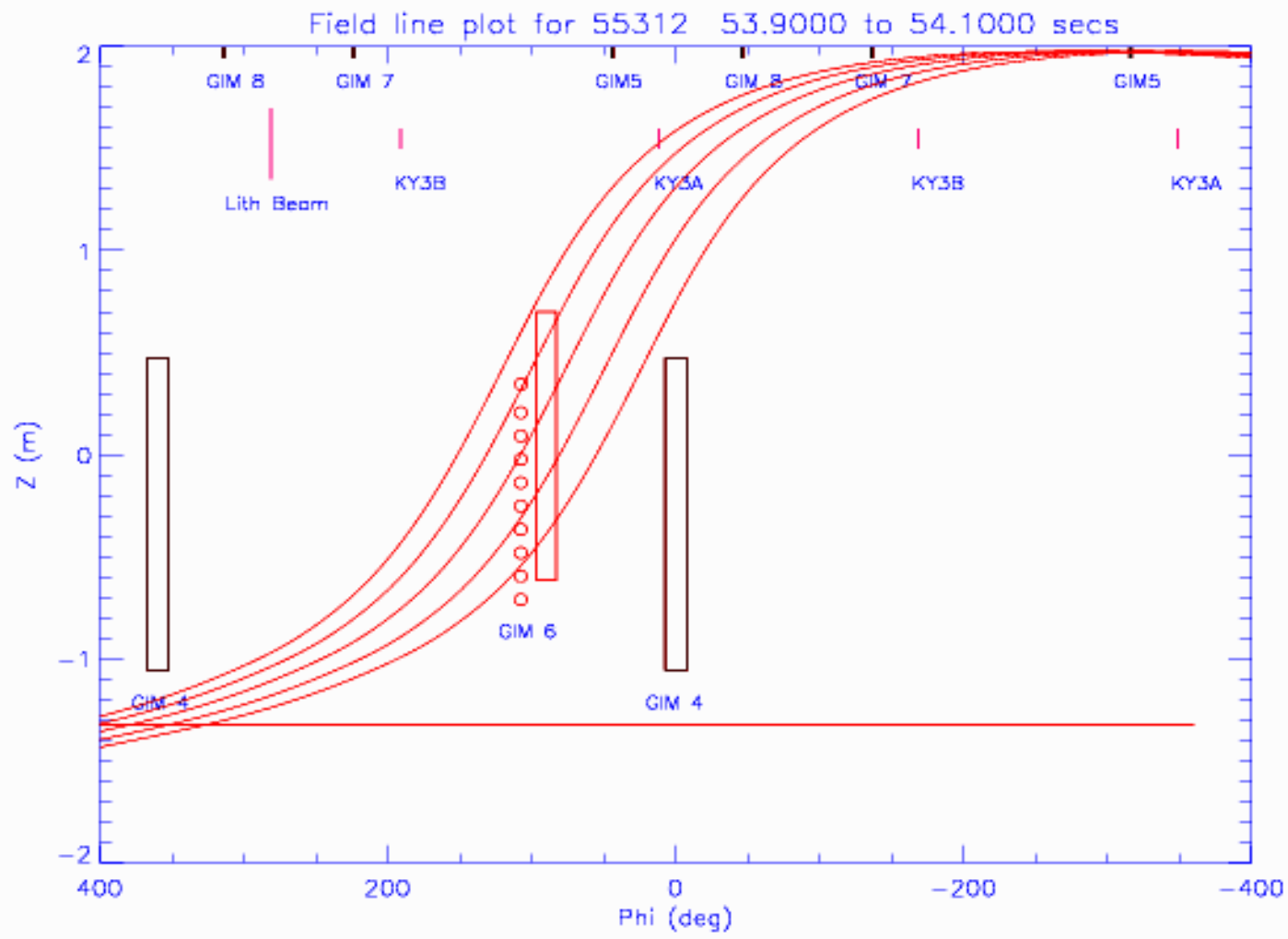


### JET Data Display 2.2

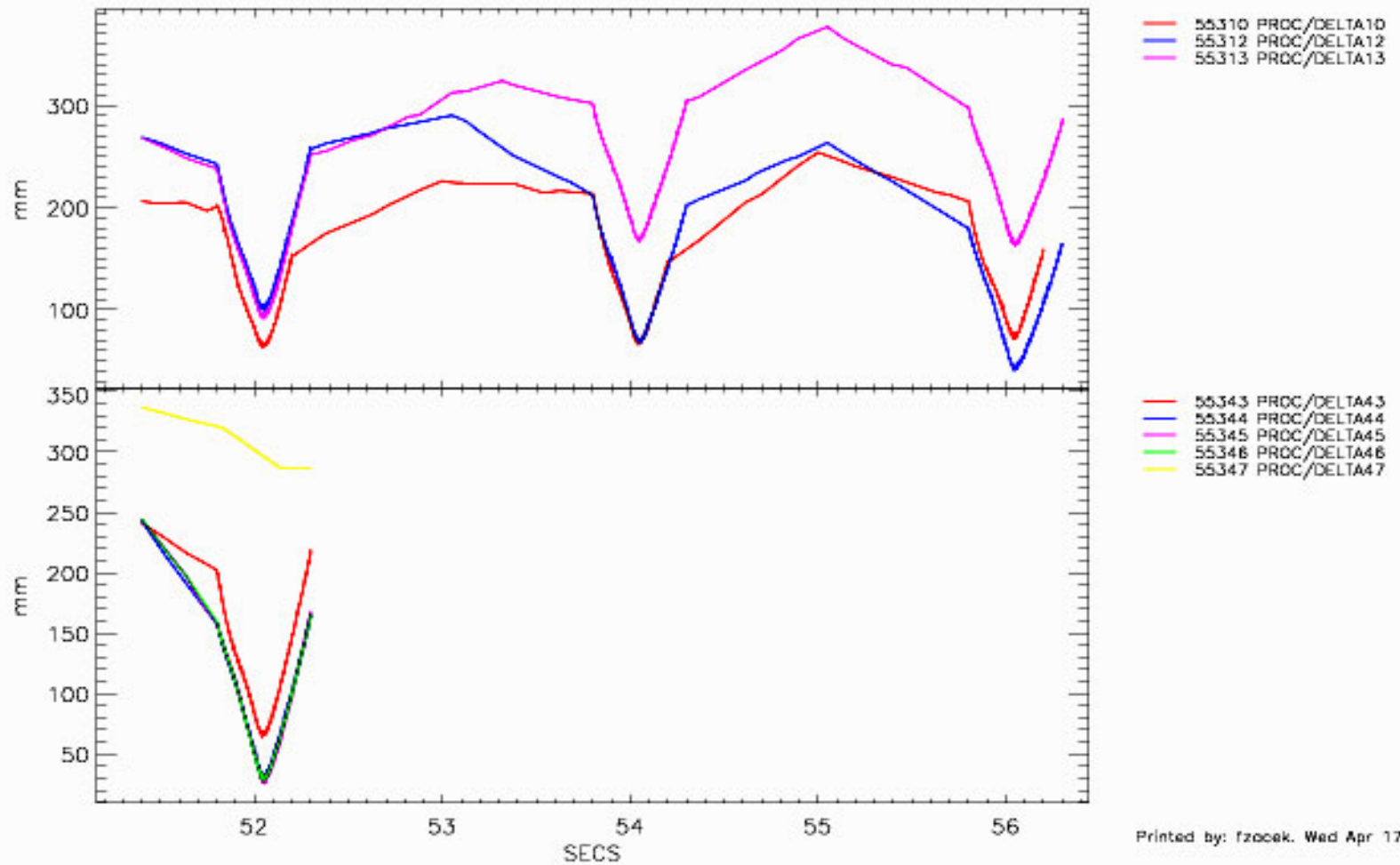








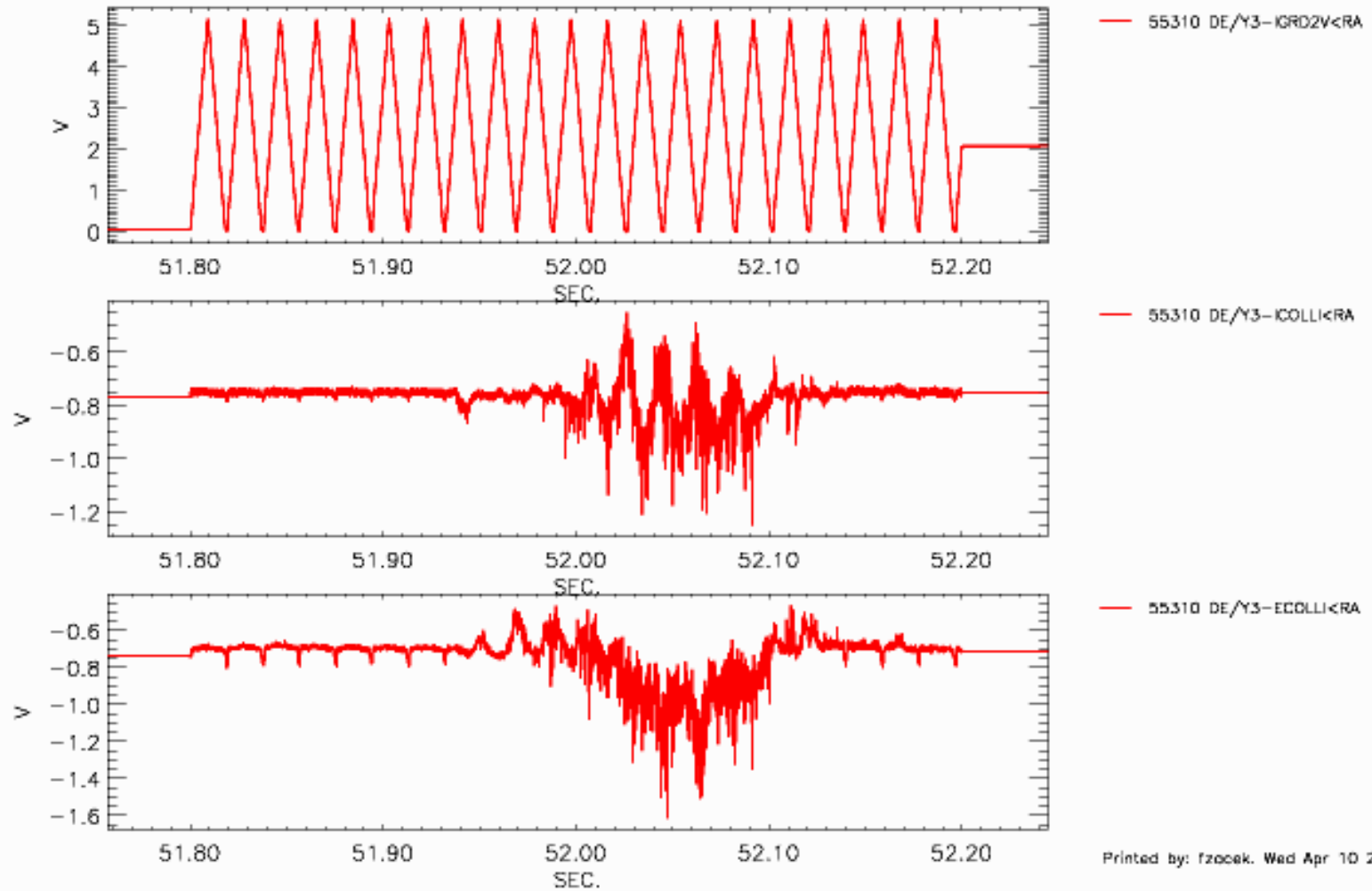
# JET Data Display 2.2



Printed by: fzocek. Wed Apr 17 2002

no LHW

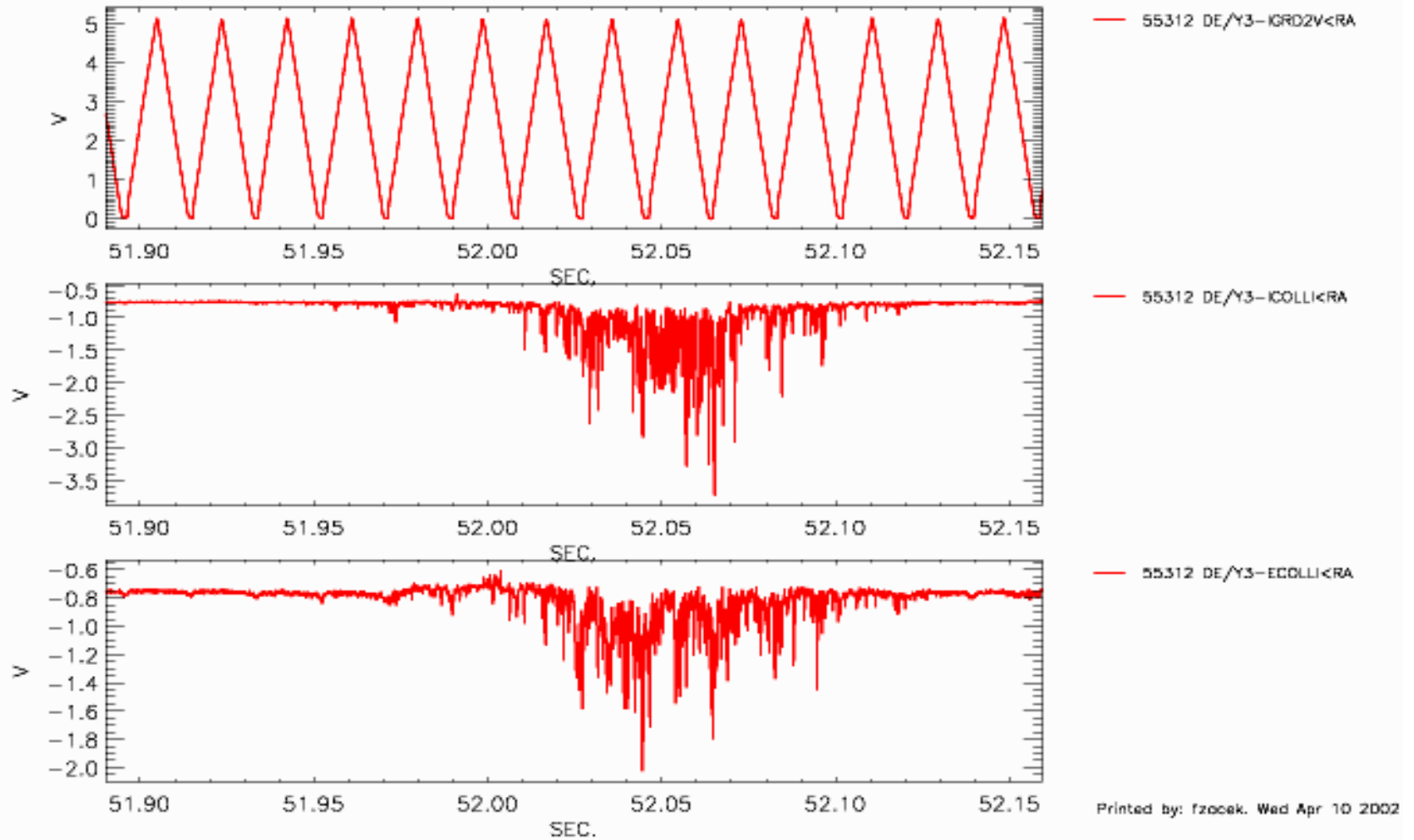
### JET Data Display 2.2



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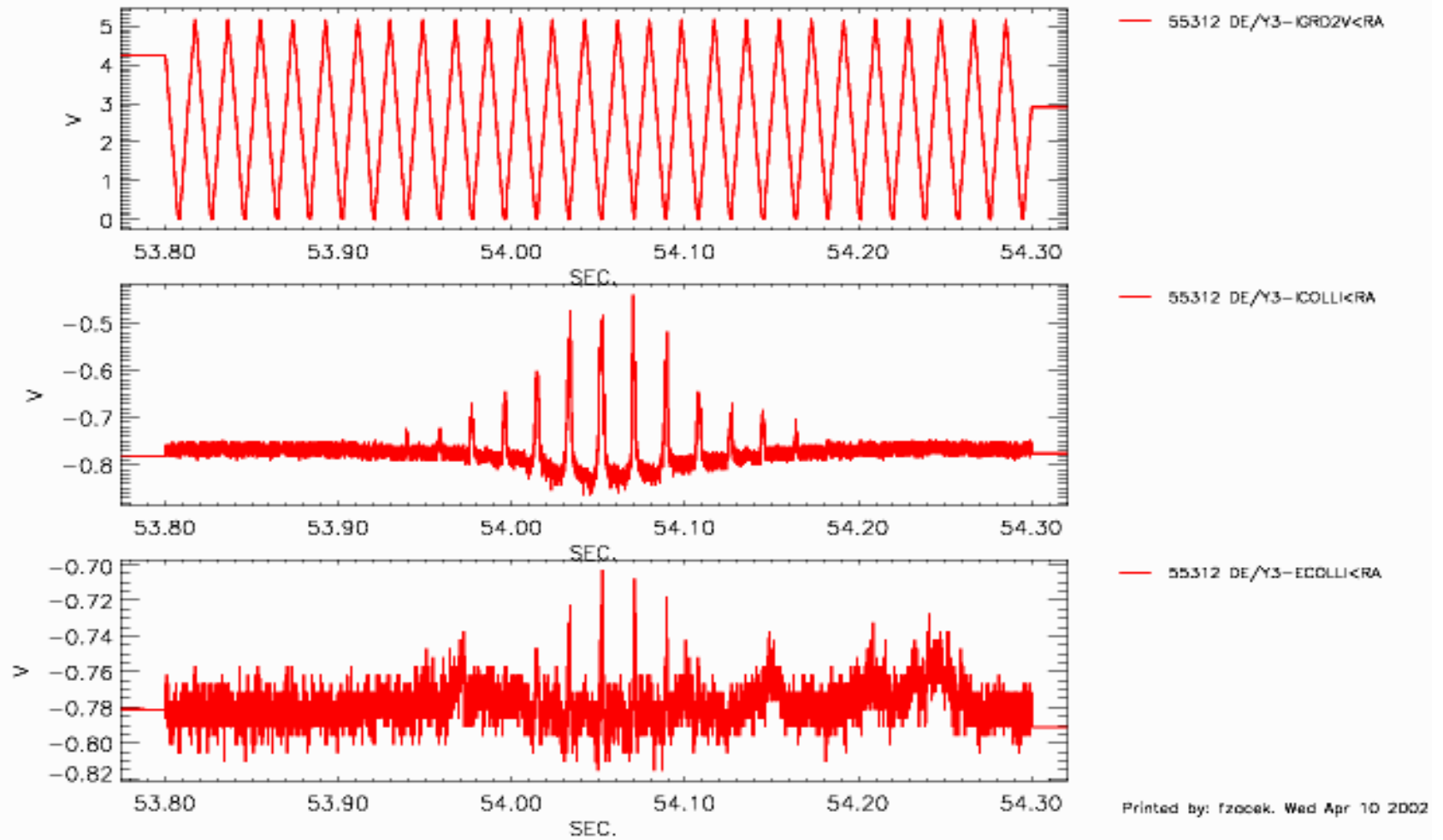
LHW 0.6MW, q~3.5

JET Data Display 2.2



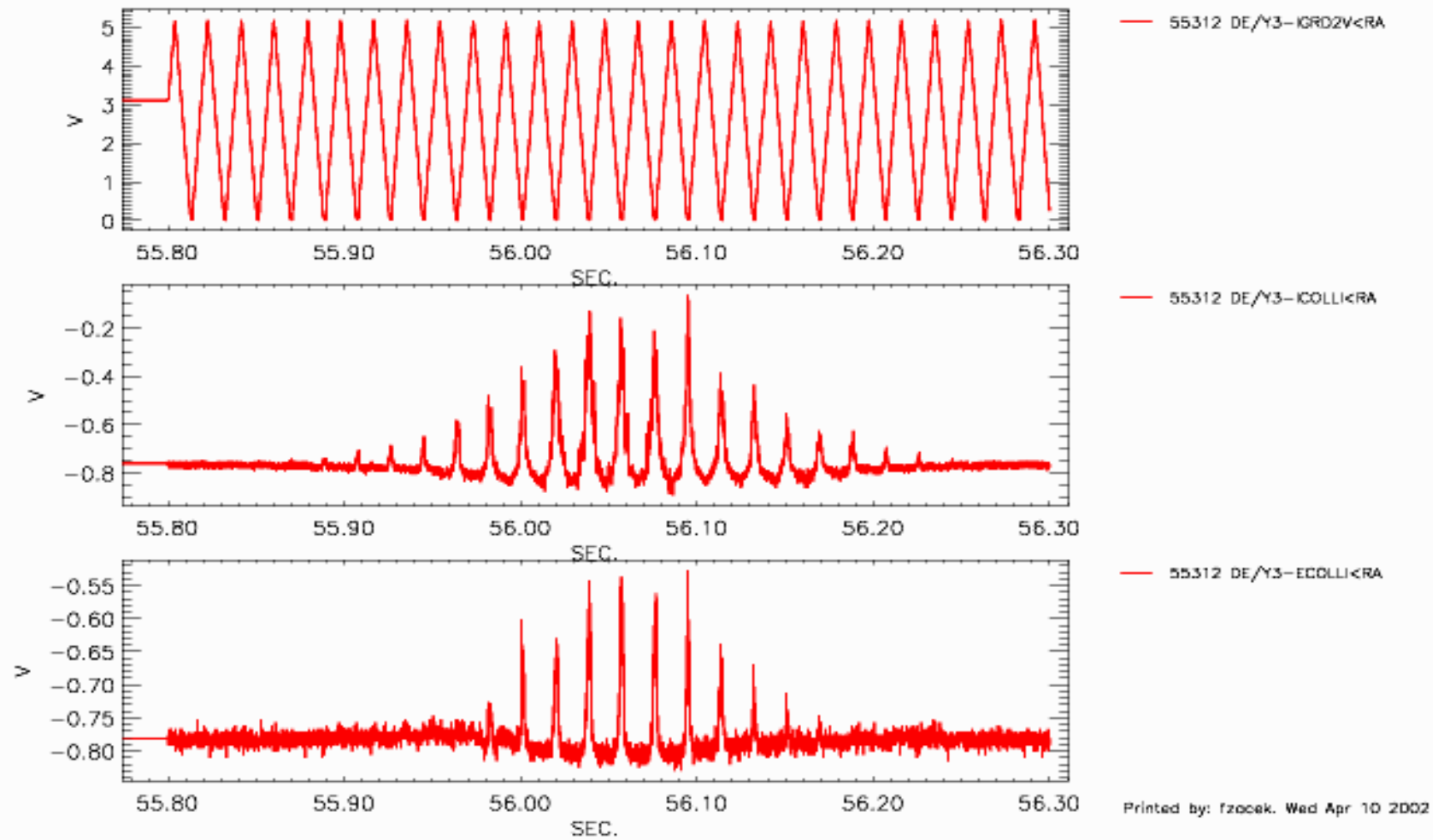
# LHW 0.6MW, q~4

JET Data Display 2.2



# LHW 0.6MW, q~4.5

## JET Data Display 2.2



# General conclusions:

- The character of RFA collector current (ion mode operation) dependence on the analysing voltage is **substantially different in the first stroke and in those two others**, independently on the fact if LHW is switched off (#55310) or switched on (#55312);
- such difference between the strokes can be hardly explain by small change of plasma configuration observed between the strokes;  
is the reason a **loss of magnetical connection** with the launcher ?
- the character of collector current during **the first stroke exhibits a certain dependence on the LH power** presence:
  - without this power (#55310) signal is depending on the analysing voltage (i.e. the I-V characteristics are visible), while
  - **with the power** (#55312) the signal is on the voltage independent, it is very noisy and moreover, **it remains all the measuring period negative**;is the reason penetration of the fast electrons, overcoming the insufficient biasing voltage of the entrance slit (100V only) ?