File system, SaveRestore and Sequencer for LINAC2, DESY2, PETRA3 and FLASH, a status report

"…on the road to a more reproducible operation"

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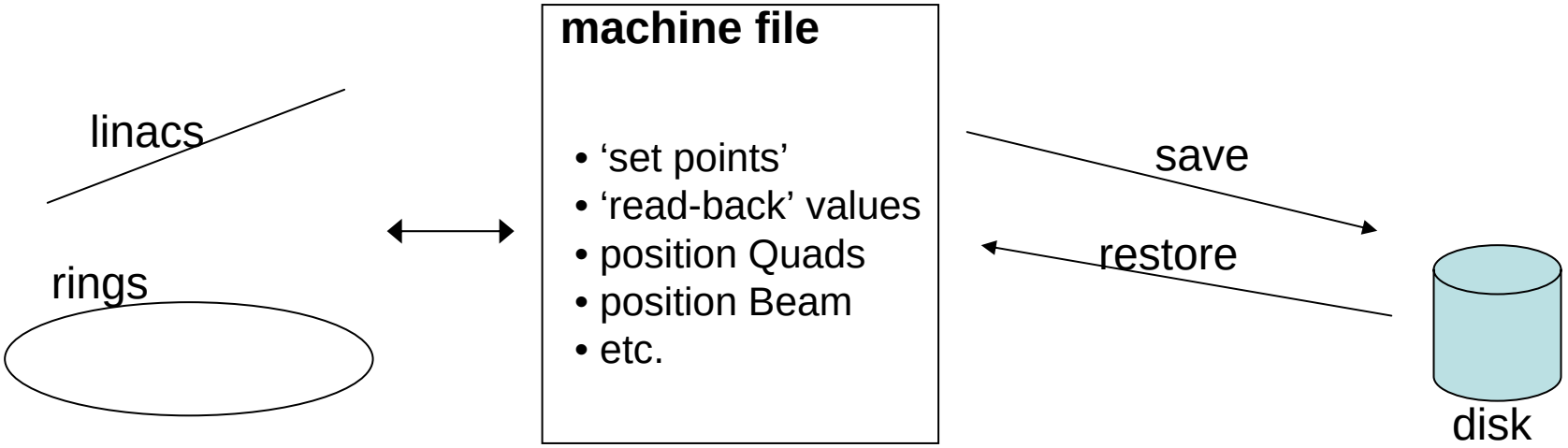
Basic principle of "Machine file system"



More features:

- compare: between file and machine values
- compare: between set-points ("Soll") and read-back ("Ist") values
- compare: between file 1 and file 2 values
- browse saved files: search function
- sequencer: to restore a file following a 'procedure' or sequence
- print 'main parameters' in e-logbook
- (for FLASH) scale magnets with energy changes
- same program for all machines: FLASH, Linac II, DESY II, etc

Spin-off:

- SaveRestore tool

Motivation

~~-to make the operation easier… maybe~~
~~(but it is more work for the operators, coordinators, experts)~~

-to save and later reproduce the same operation conditions
(if it is correctly configured)

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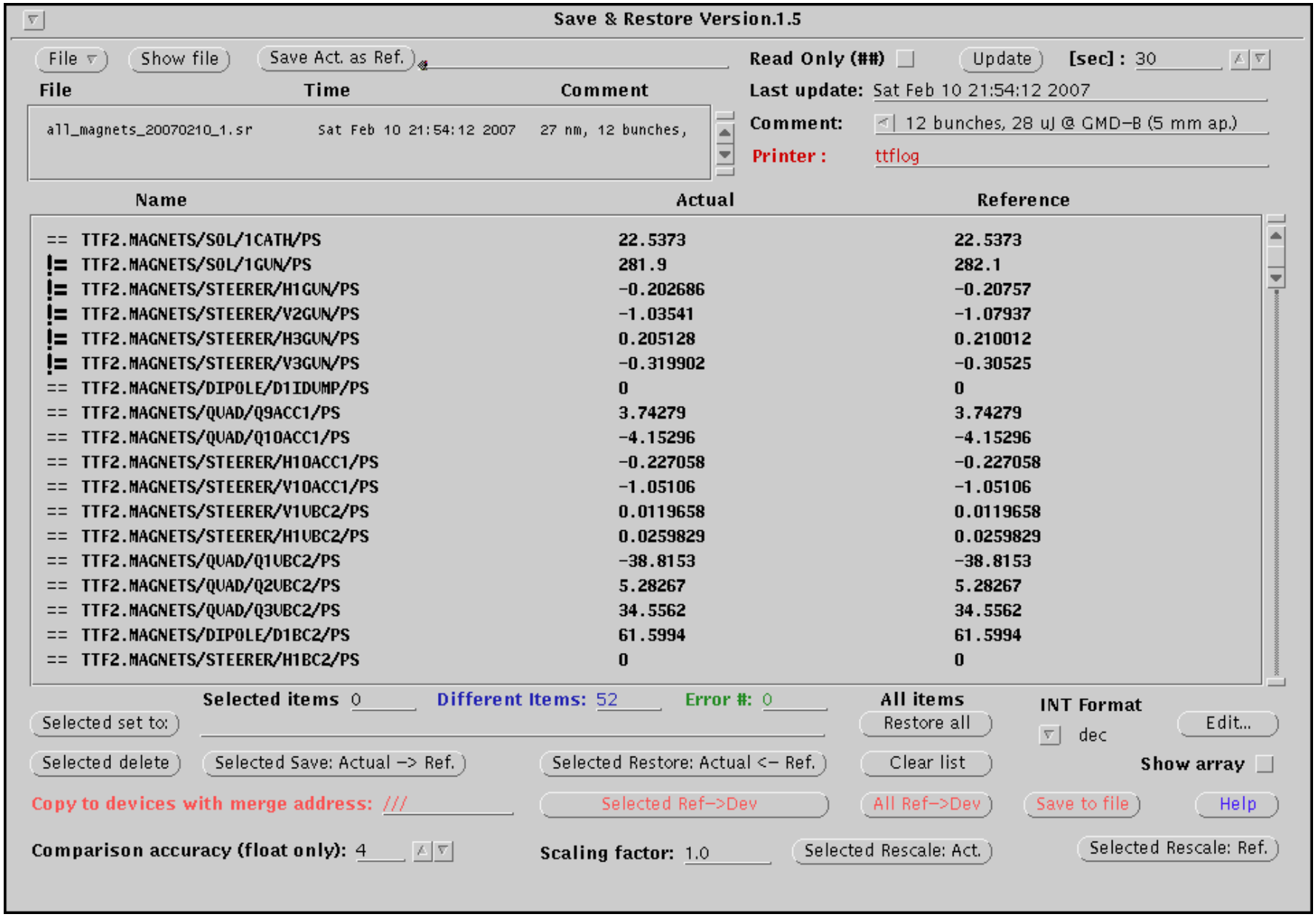
for Linac II, DESY II, PETRA III :

"it is an essential tool"

for FLASH :

it will replace the "save & restore tool"

The save & restore tool



Scope of this presentation:

- status of the project

- show how you work in FLASH with the file system

- show the new possibilities: Catalog, Sequencer, symbolic files

out of scope:

to explain in detail how to use the program:

- because the program must be intuitive and self-explained
- because it DOES changes operation parameters
- because it is not yet available for FLASH

Present status of File System

Linac II and **DESY II** : file Catalog and Sequencer are in use
(with a long list of modifications, wishes, bugs to fix)

FLASH : files are being saved
some tests with the sequencer have been made

Next steps

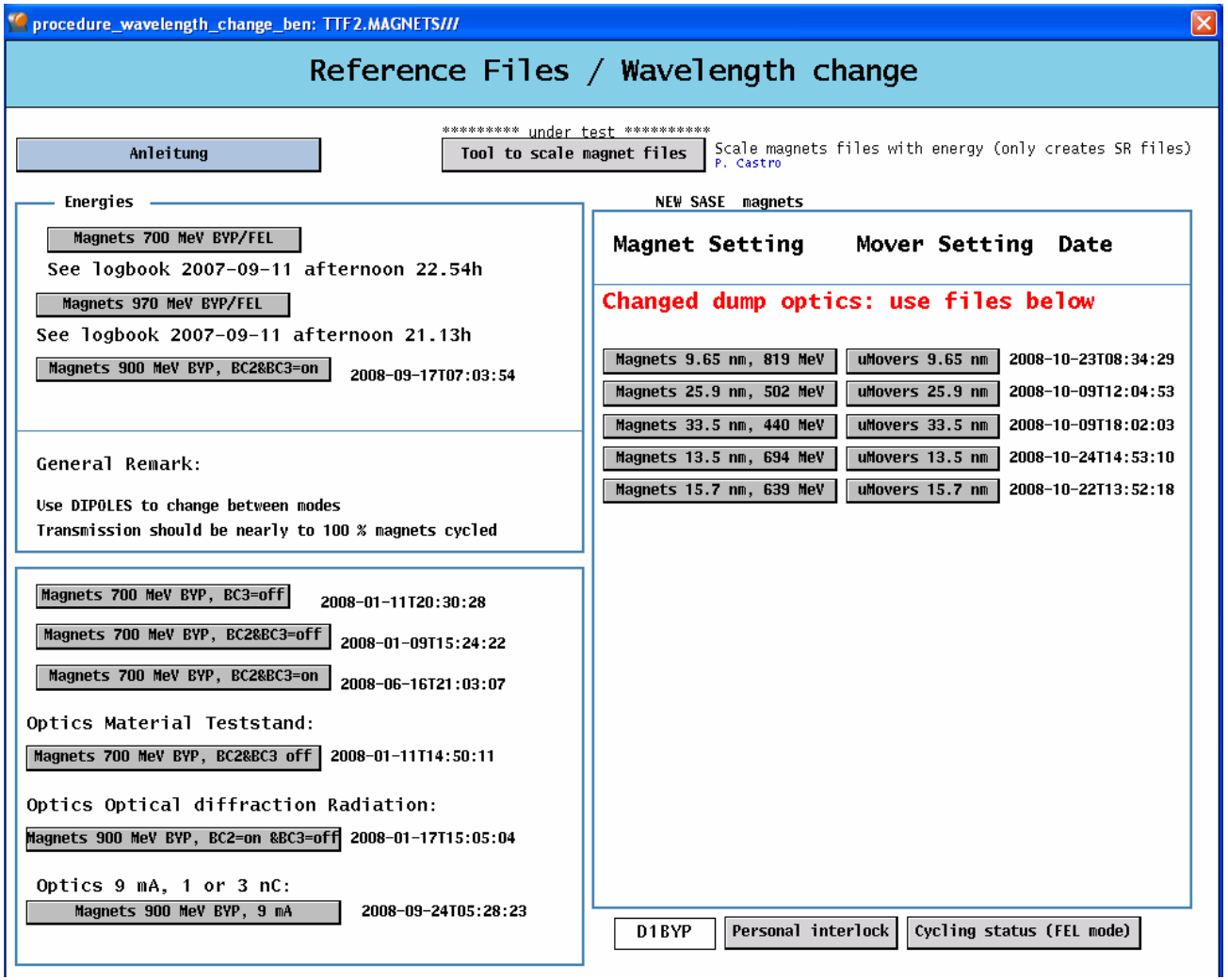
FLASH : make Catalog available for operation

PETRA III : file Catalog and Sequencer are expected for day 1

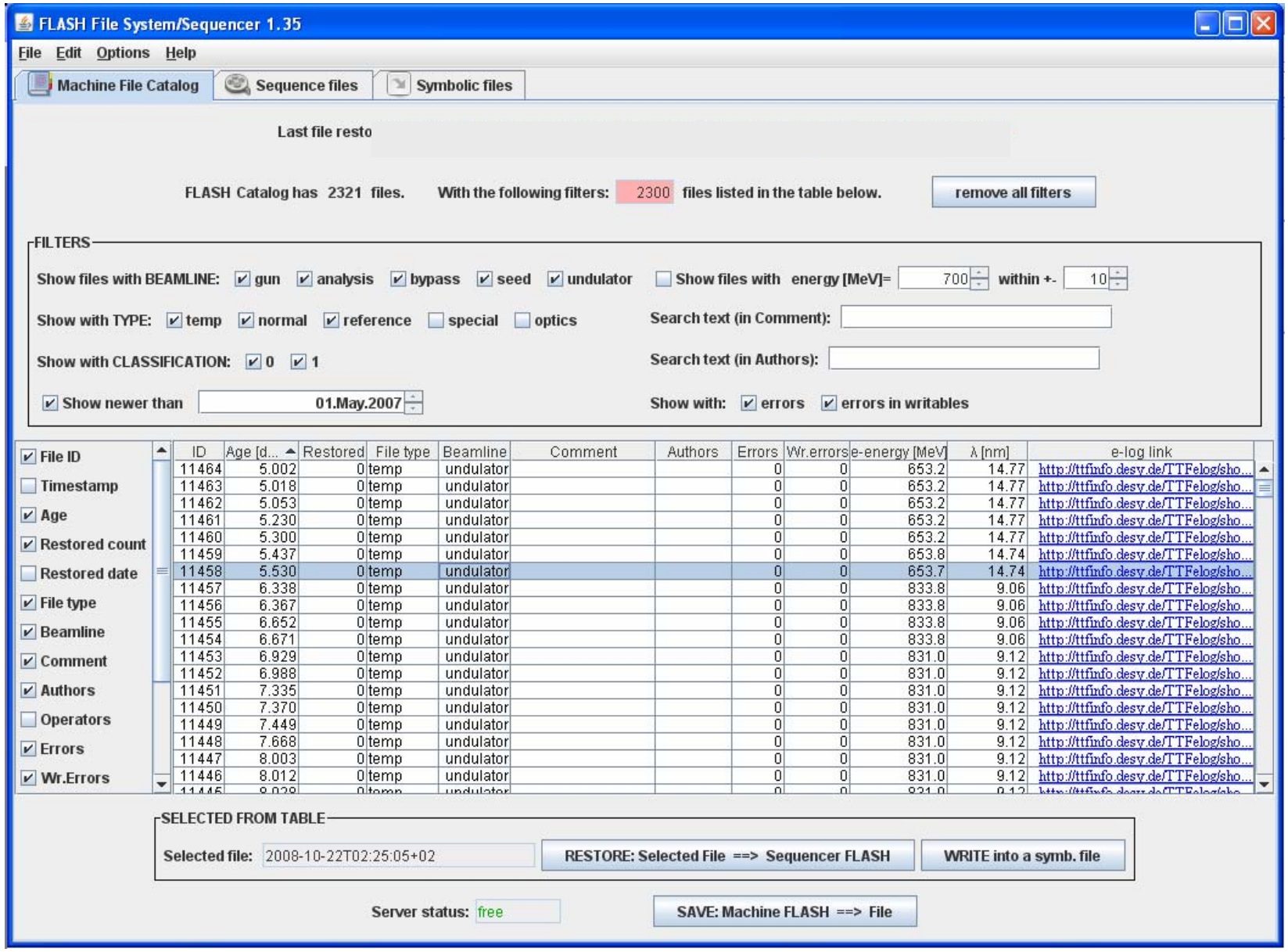
List of files saved (> 10000 in 4 years)

…
all_magnets_20070312_4.sr
all_magnets_20070313_1.sr
all_magnets_20070314_1.sr
all_magnets_20070314_2.sr
all_magnets_20070314_3.sr
all_magnets_20070314_5.sr
all_magnets_20070315_1.sr
all_magnets_20070315_2.sr
all_magnets_20070315_3.sr
all_magnets_20070315_4.sr
all_magnets_20070315_5.sr
all_magnets_20070315_6.sr
all_magnets_20070315_7.sr
all_magnets_20070315_8.sr
all_magnets_20070326.sr

in "save & restore tool" format

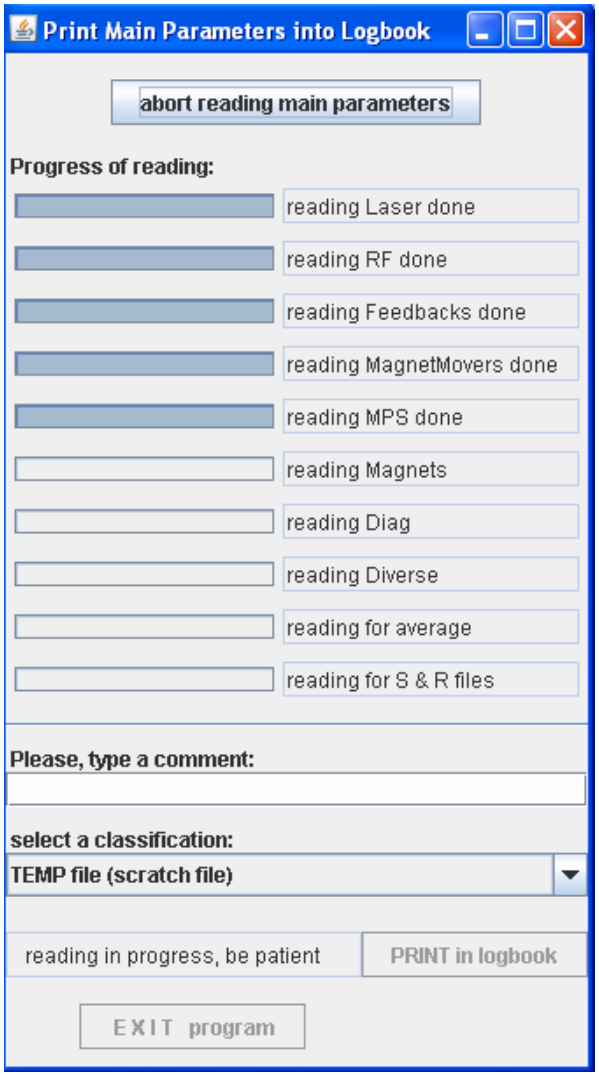


in the file system → the Machine File Catalog



→ users (operators) need to give: file type, comment, name

Save file + print 'Main parameters' in e-logbook



saves
and prints

08.03.2007 22:51 ttflinac — Main linac parameters

Laser
Number of bunches 15
Bunch frequency ..... 100 kHz
Macropulse rep'rate .... 5 Hz
Flashlamp current 2
Flashlamp start time ... 2.16 ms
Attenuator SP 5488
Iris diameter ..... 1.95 mm
Piezo Voltage ..... 4.944 V

Gun
Feedforward/Feedback ... on/on
Pfwd SP 3.25
Phase SP ..... -112.68 deg
Pfwd (peak) ..... 3.509 MW
Prefl (peak) ..... 1.711 MW
Pfwd (sample point 700) 3.6264 MW
Prefl (sample point 700) 0.053319 MW
Flat top ..... 200 us
Water temperature SP ... 60.31 deg C
Main solenoid ..... 294.6953 A
Bucking coil ..... 26.0018 A
Gun dipole ..... 0 A
Charge 3GUN(T1) ..... 0.91614 nC

ACC1
Feedforward/Feedback ... on/on
Pfwd SP 15.21
Phase SP 176.9183
Pfwd C1.ACC1 ..... 54.1813 kW
Pfwd C5.ACC1 ..... 251.9692 kW
Flat top ..... 100 us
Beam loading comp. (BLC) off
BLC current/duration ... 0.8 mA/70 us
Dipole BC2 ..... 61.5994 A
Pyro 9DBC2 ..... -0.060908 V
Radiator 9DBC2 ..... open

ACC2/3
DSP trigger rate ..... 5 Hz
Feedforward/Feedback ... on/on
Pfwd SP 21.9
Phase SP 88.7419
Pfwd C5.ACC2 ..... 0.1567 kW
Pfwd C1.ACC3 ..... 0.09197 kW
Flat top ..... 188 us
Beam loading comp. (BLC) off
BLC current/duration ... 0.8 mA/600 us
Dipole BC3 ..... 40.694 A
Pyro 14BC3 ..... -0.097174 V
Pyro 4DBC3 ..... -0.065883 V
Radiator 4DBC3 ..... open

ACC4/5
DSP trigger rate ..... 5 Hz
Feedforward/Feedback ... on/on
Pfwd SP 18.06
Phase SP 178.7218
Pfwd C1.ACC4 ..... 0.05278 kW
Pfwd C2.ACC5 ..... 0.000939 kW
Flat top ..... 185 us
Beam loading comp. (BLC) off
BLC current/duration ... 0.8 mA/660 us

Collimator
Dipole D1ECOL ..... 122.4912 A
Energy dogleg ..... 691.8683 MeV

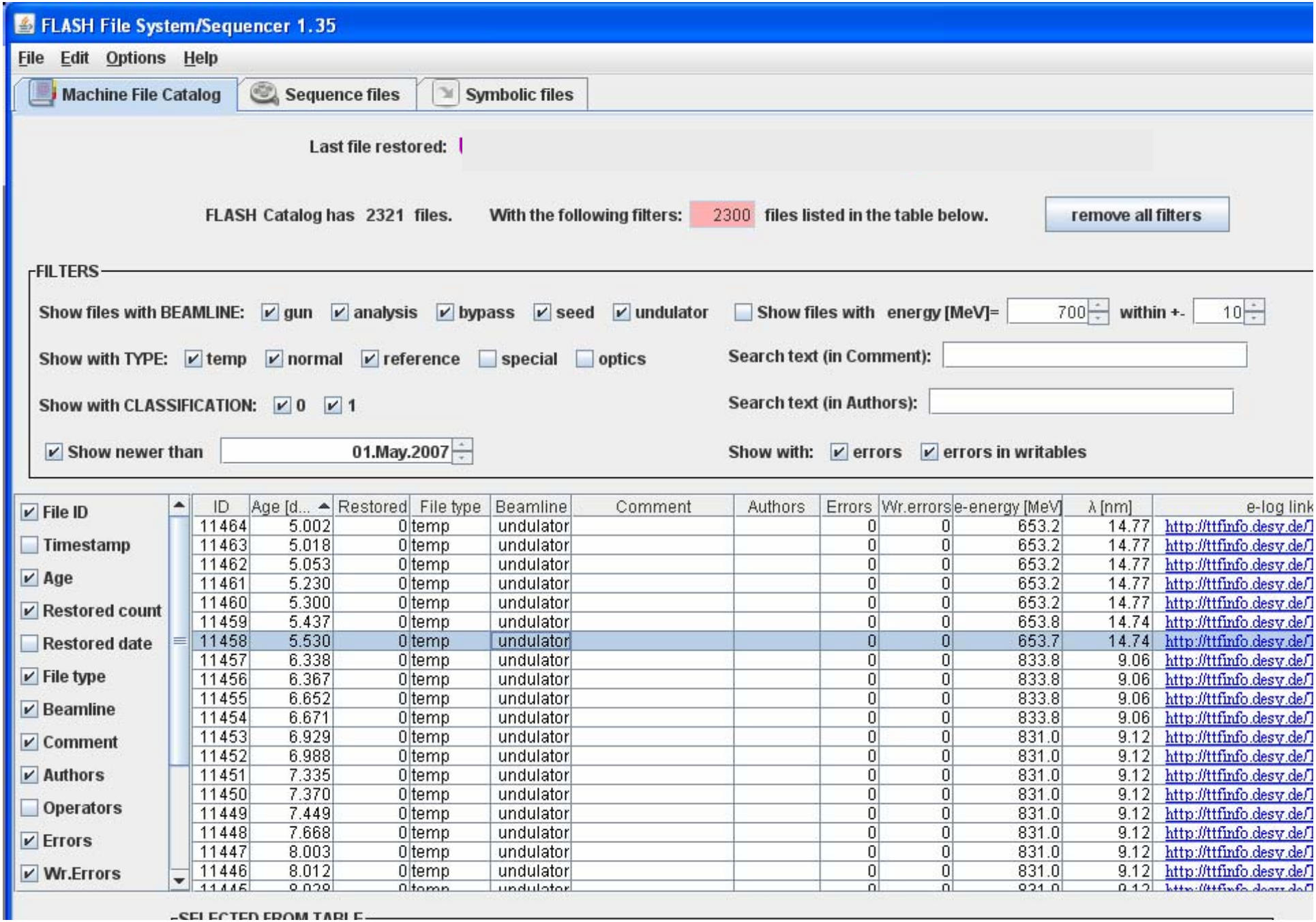
Bypass
Dipole D1BYP ..... 0 A
Energy bypass ..... 2.6006 MeV

Dump
Dipole D1DUMP ..... 133.5912 A
Dipole D6DUMP ..... 147.0176 A
Radiation level (wall) . 163 counts/ms

Feedbacks
Charge feedback ..... off
Charge feedback SP ..... 0.2 nC
PTO feedback ..... on

Magnets saved to:
/home/ttflinac/save_restore/Magnets/autosaved/all_Magnets_20070308T225118.sr
uMovers saved to:
/home/ttflinac/save_restore/Micromovers/autosaved/uMovers_20070308T225122.sr
Orbit reference saved in
/home/ttflinac/bin/matlab/orbit_stability/2007-03-08T225123-orbit-stability

in the file system → search using filters



open file saved, compare with 'machine values' and restore

with save & restore tool

...
all_magnets_20070312_4.sr
all_magnets_20070313_1.sr
all_magnets_20070314_1.sr
all_magnets_20070314_2.sr
all_magnets_20070314_3.sr
all_magnets_20070314_5.sr
all_magnets_20070315_1.sr
all_magnets_20070315_2.sr
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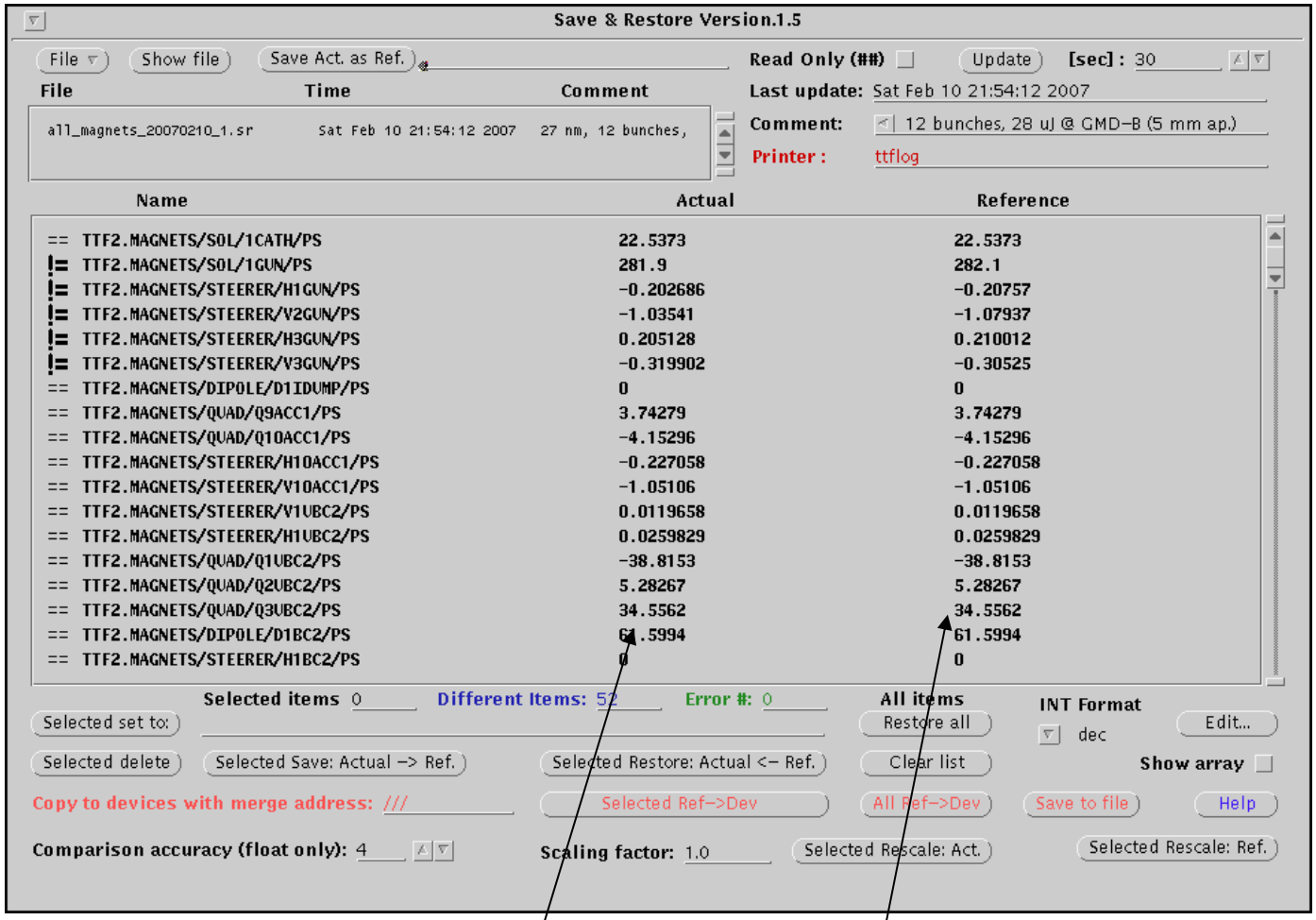
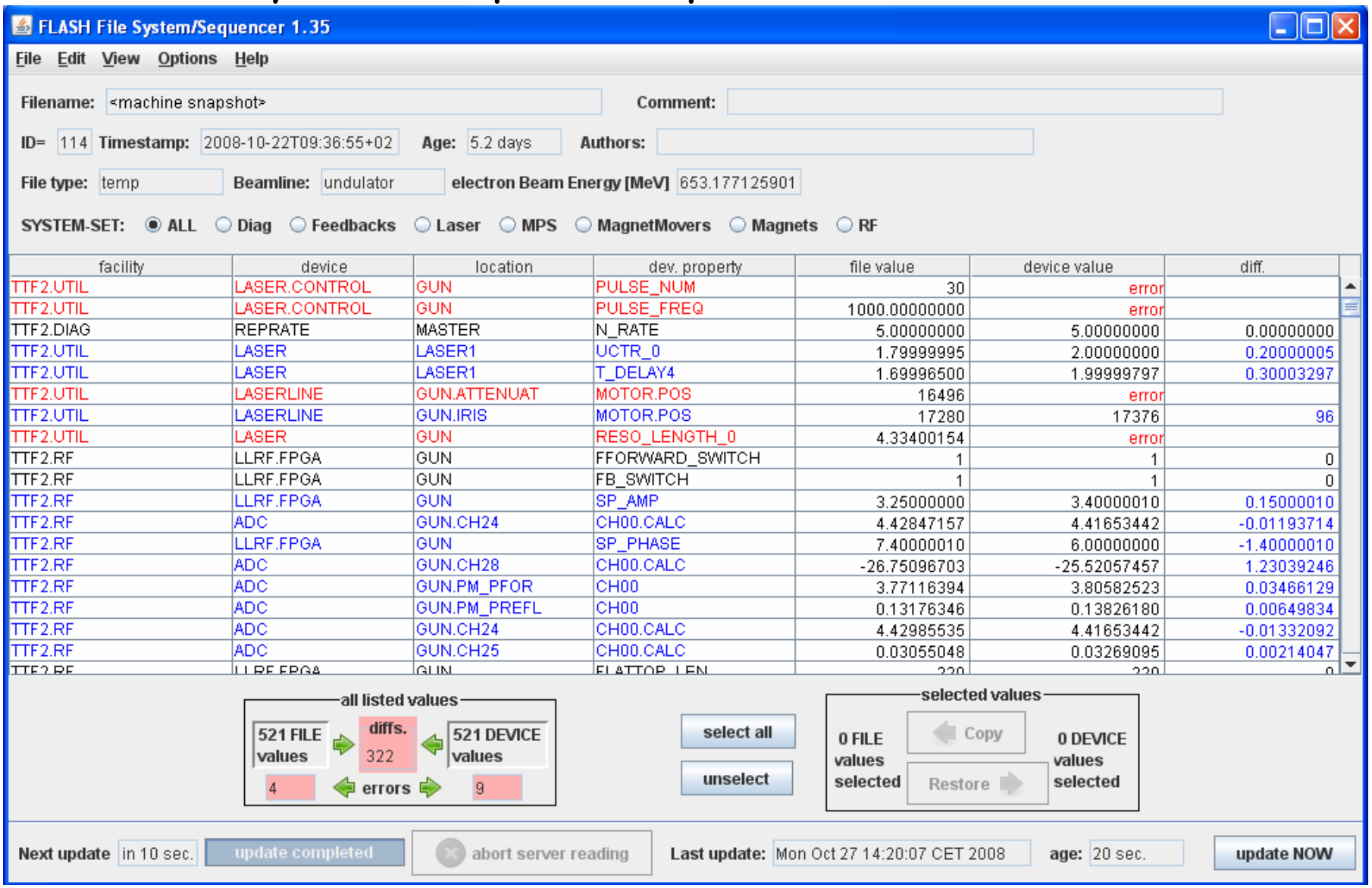
all_magnets_20070315_5.sr
all_magnets_20070315_6.sr
all_magnets_20070315_7.sr
all_magnets_20070315_8.sr
all_magnets_20070326.sr



machine values

file values

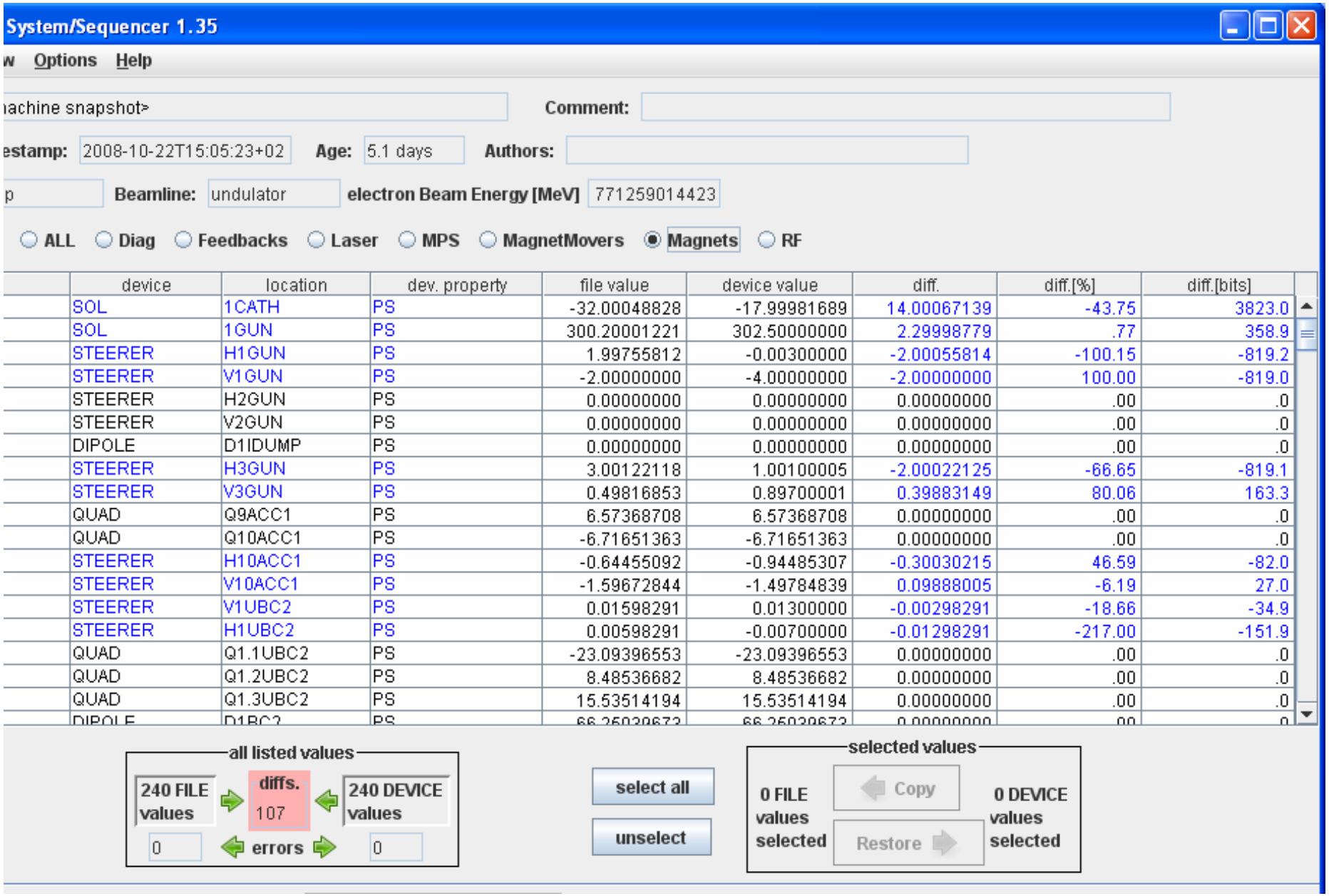
in the file system →open, compare and …



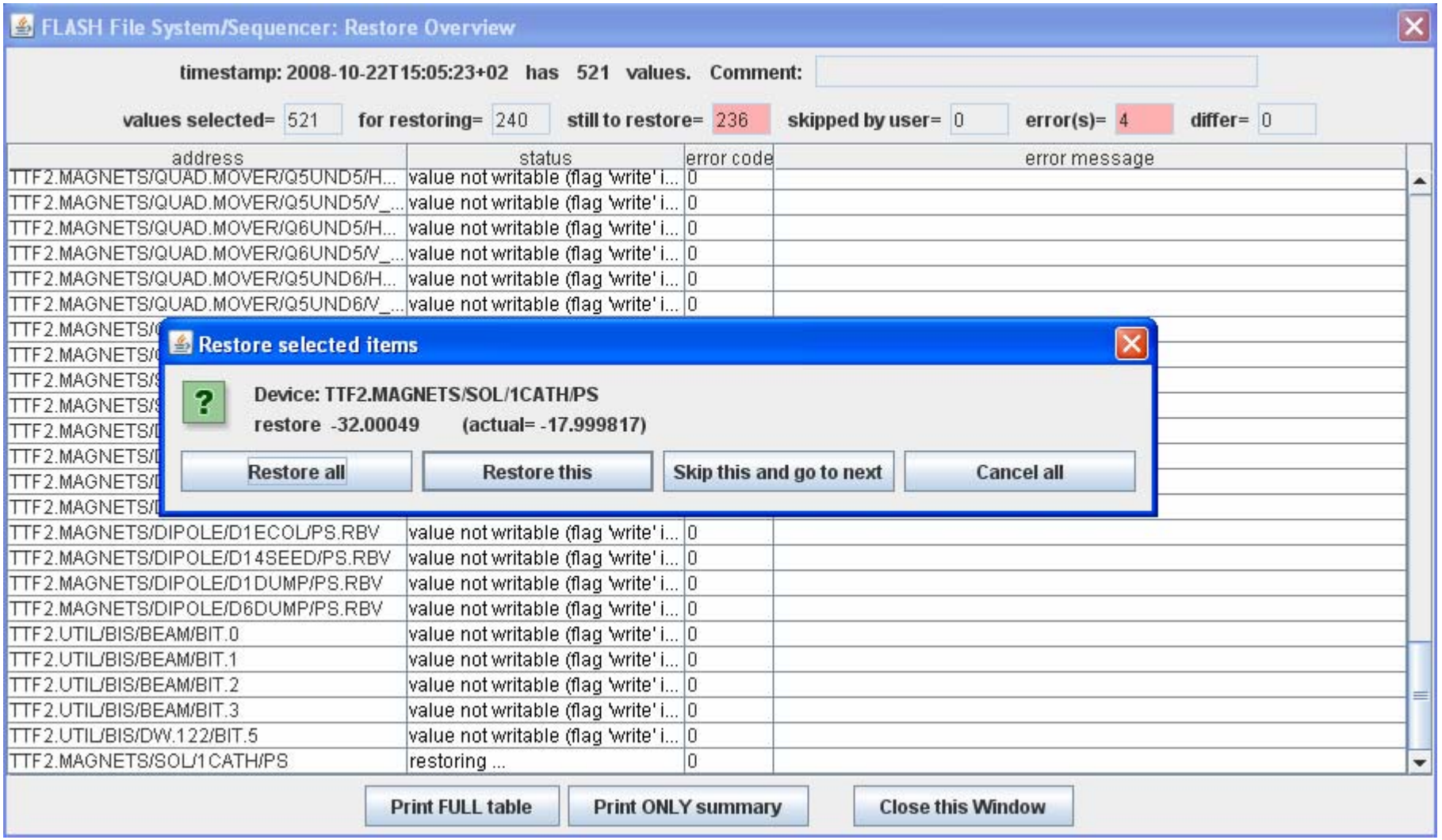
more systems: Diagnostics, Feedbacks, Laser, MPS, RF

→ coordinators and experts need to configure it

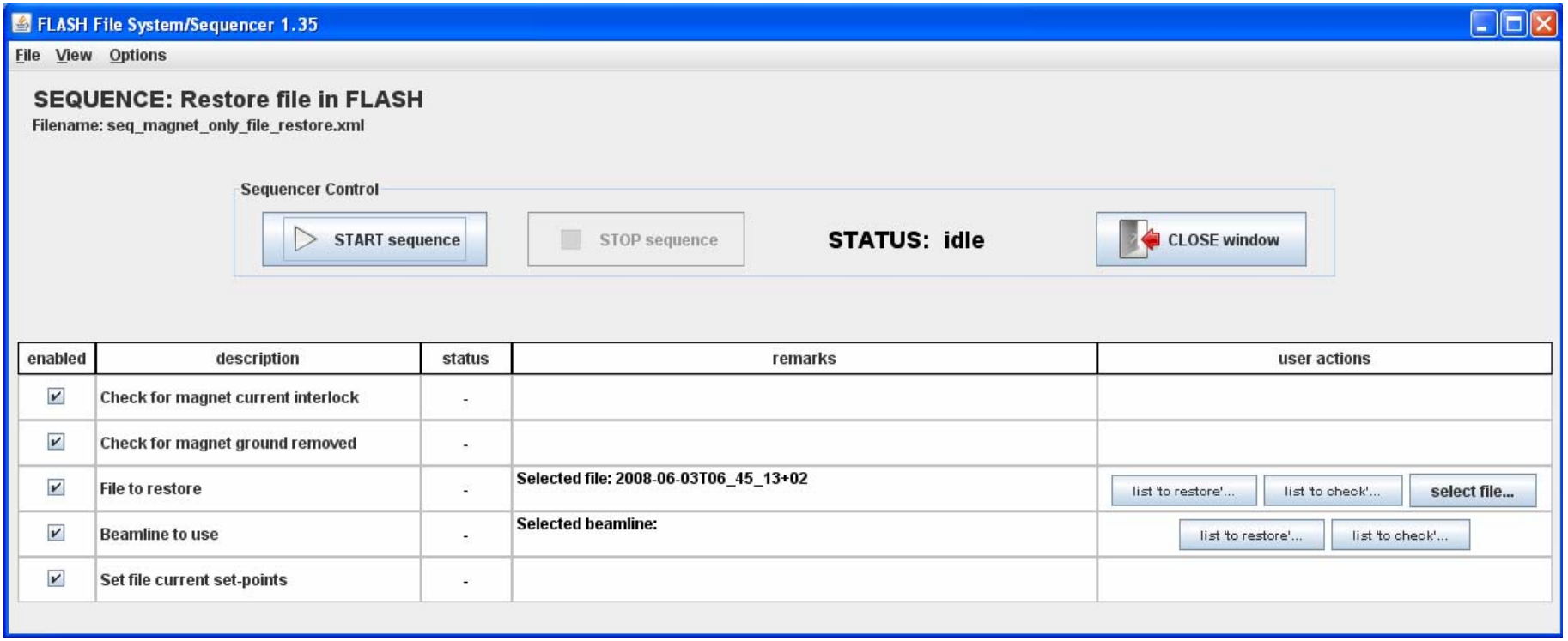
Compare floats: difference in percent
Compare currents: difference in bits



in the file system → restore

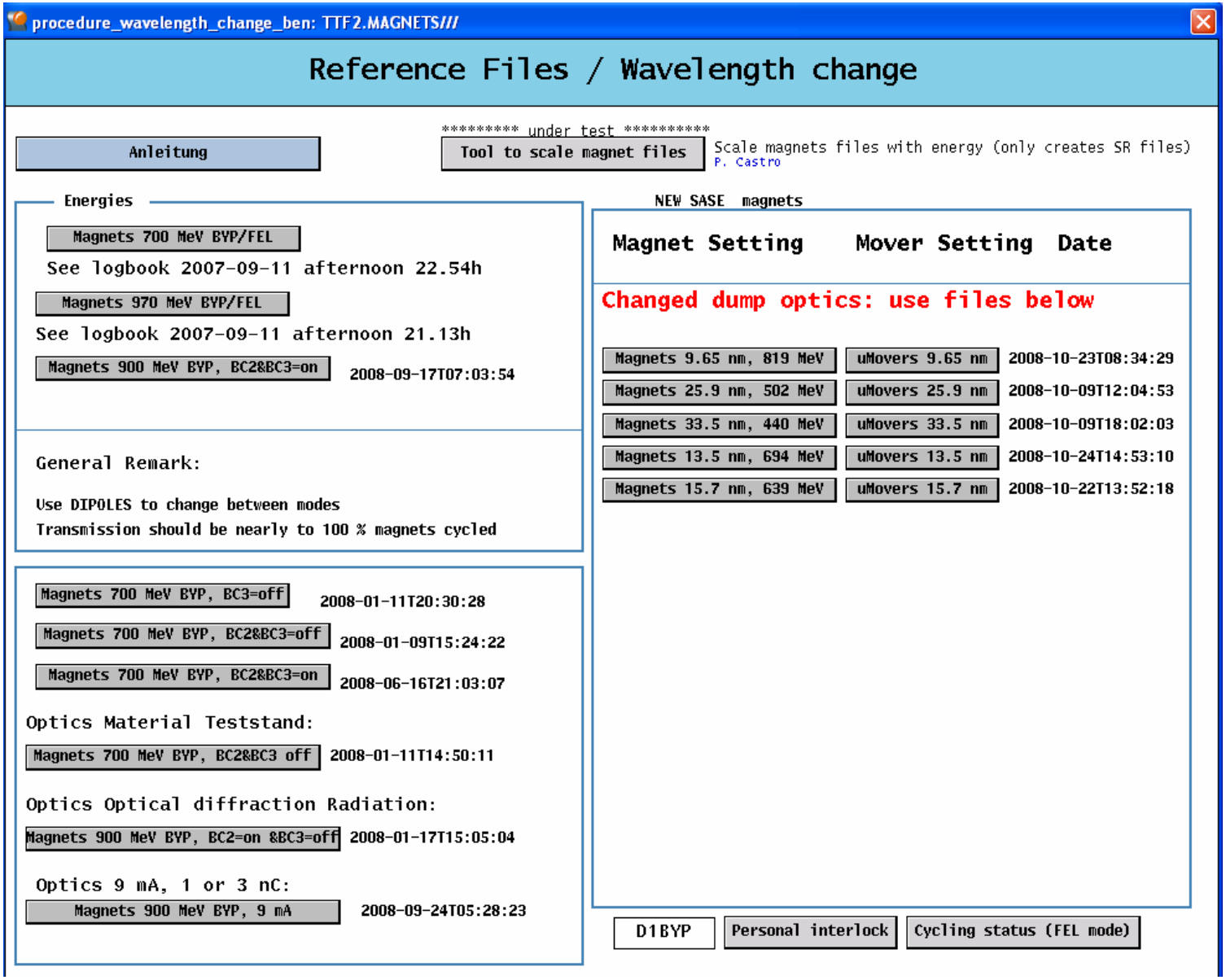


in the file system → restore using the sequencer

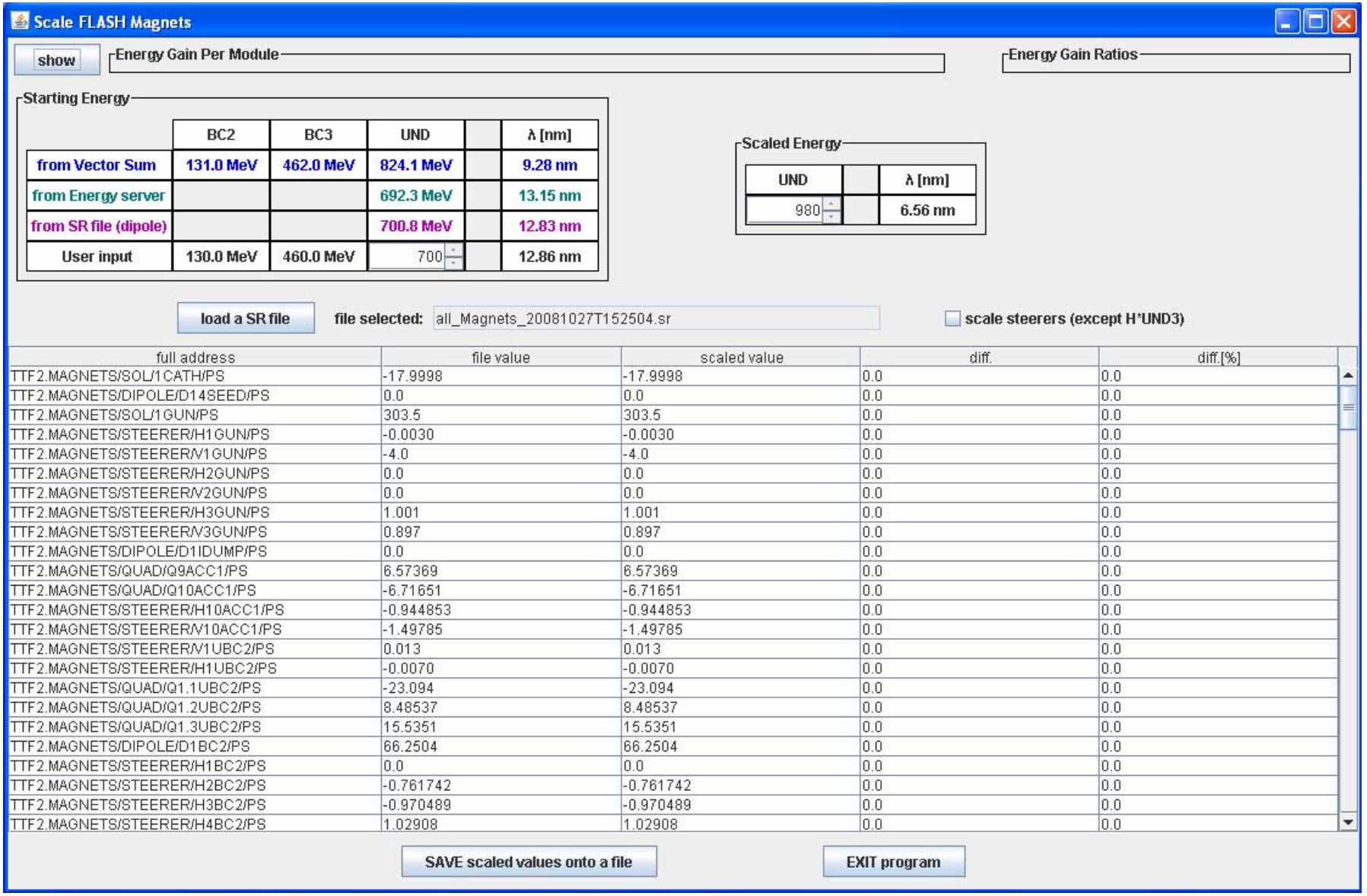


more time needed for test (last test was in July)

to change SASE wavelength



Scaling magnet files



Summary and outlook

Main features:

- it is 'universal' : same for all machines (rings and linacs)
- easy to search for files
- compare file-to-machine or file-to-file
- run procedures (with the sequencer)
- run in all OS: Unix, Linux, Windows, etc.

- FLASH can already now profit from it
  → decision has to be taken
- we need the help of coordinators and experts to configure it correctly
- feedback (bug reports, ideas) from all users is very welcome

Thank you for your attention

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