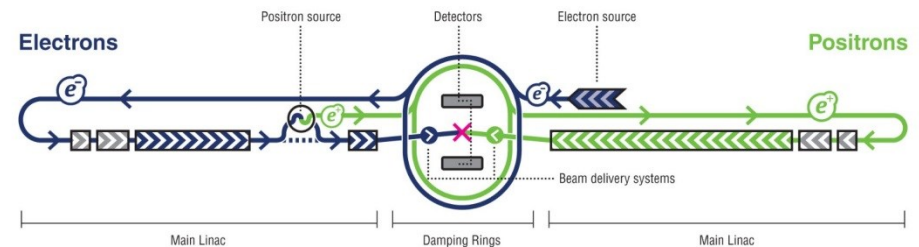
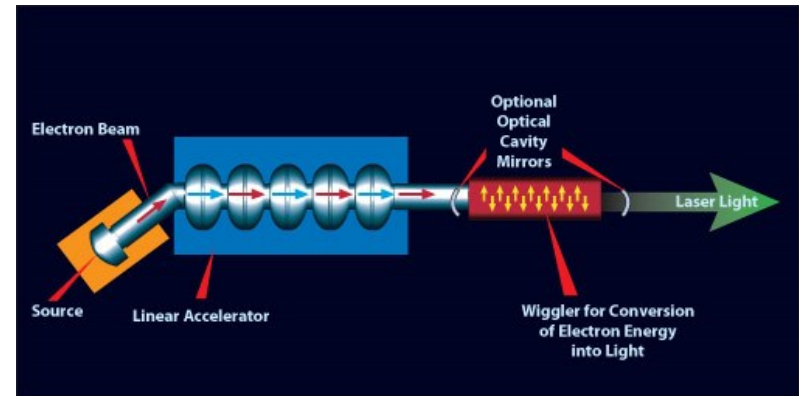


Last Interlock Investigator LILI

- **PITZ**
- **Interlock System**
- **My project: LILI**
 - **Task**
 - Saving tool
 - Reading & plotting tool (GUI)
 - **Planned tool**
 - **Save tool**
 - **GUI**
 - **Next Steps**

Maya Dhondt
Final Presentation
Zeuthen, 05.09.2013

- **Goal:** optimise sources of high brightness electron beams for FELs and LCs.
- Small transverse (and relatively small longitudinal) emittance.
- Design, characterise and optimise.



- **Protects accelerator from damage.**
- Also protects users and is designed to identify problems.
- Pulls data from various diagnostics.
- Each IL event must be investigated.
- **Time consuming!**
- LILI, designed to make this process easier.

PITZ control module and ADC modules showing various detectors

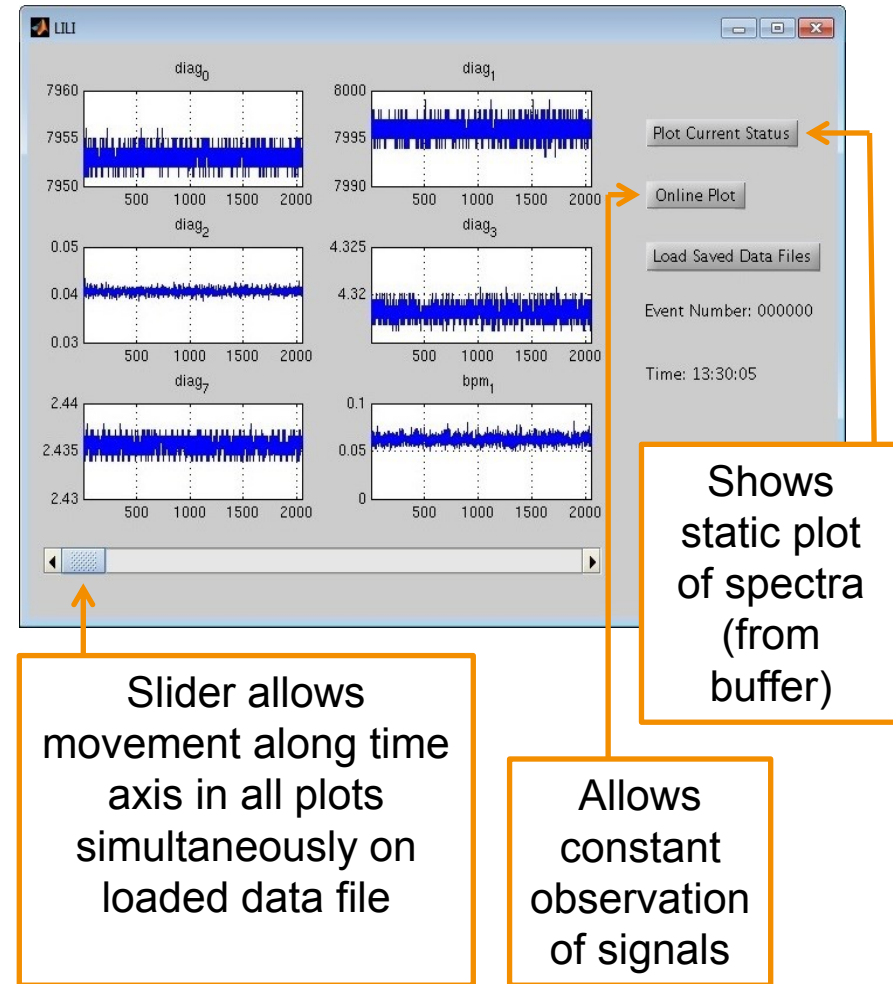
The image shows two overlapping software windows. The top window, titled 'pitz', is the 'PITZ Control' interface. It features a vertical stack of buttons: 'overview', 'adc modules', 'beam inhibit system', 'FSM', 'DAQ (NOT bubo)', 'diagnostic', 'interlock', 'laser beam line', and 'laser'. To the right of these buttons are status indicators, including 'why?' labels and a 'flags' section with colored bars. The bottom window, titled 'all_adc', is the 'ADC MODULES' interface. It contains a 'Table' with columns for 'RF2.ADC0' through 'RF2.ADC4'. Below this is a 'slow adc' section with a grid of modules (MOD0 to MOD12) and a 'Wirescanner ADC' section with columns for 'WS.ADC0', 'WS.ADC1', and 'WS.SIG'.

> Save Tool

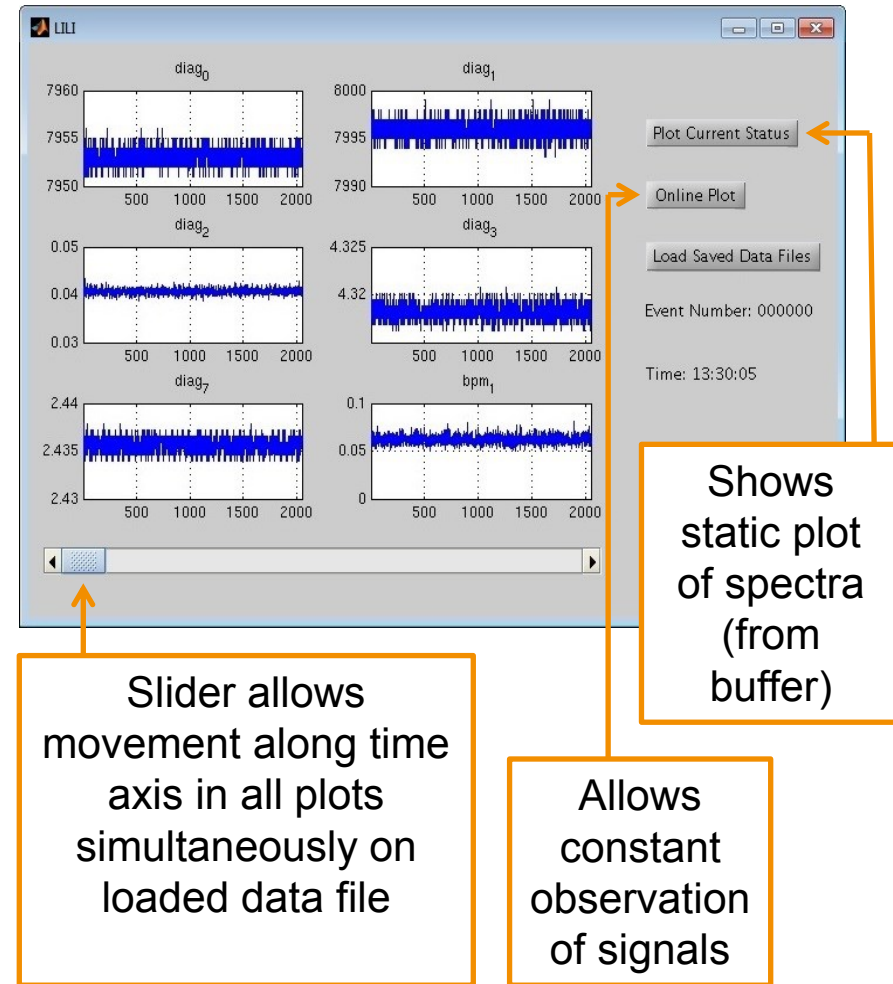
- First saving spectra to buffer, then to file.
- Two methods:
 1. Constant save to buffer -> dump to file
 2. Online save tool analyses signals for spikes and only saves data around event.

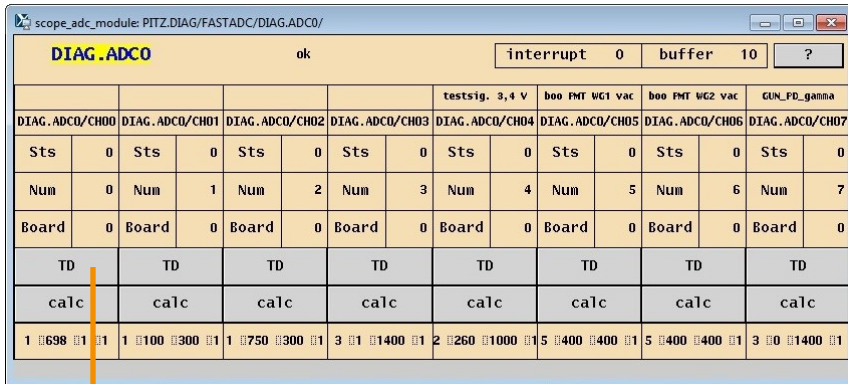
> Read Tool & Plotting

- GUI



- > **Speed prioritised.**
- > In timeframe, only first save tool completed.
- > GUI modified for further functionality.



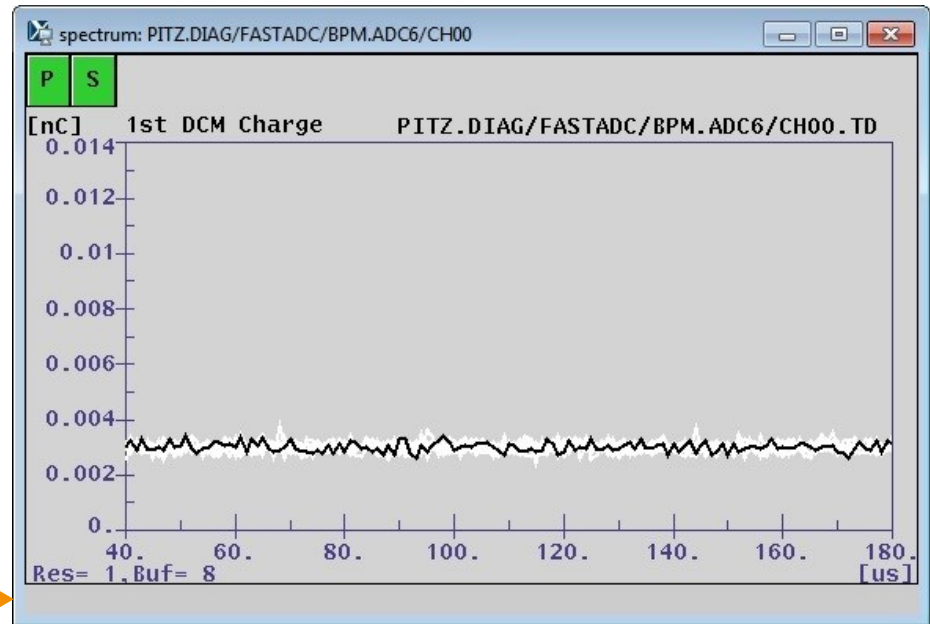


DIAG.ADC0								interrupt 0		buffer 10		?																		
				testsig. 3,4 V	boo PMT WG1 vac	boo PMT WG2 vac	GUN_PD_ganna																							
DIAG.ADC0/CH00	DIAG.ADC0/CH01	DIAG.ADC0/CH02	DIAG.ADC0/CH03	DIAG.ADC0/CH04	DIAG.ADC0/CH05	DIAG.ADC0/CH06	DIAG.ADC0/CH07																							
Sts	0	Sts	0	Sts	0	Sts	0	Sts	0	Sts	0	Sts	0																	
Num	0	Num	1	Num	2	Num	3	Num	4	Num	5	Num	6	Num	7															
Board	0	Board	0	Board	0	Board	0	Board	0	Board	0	Board	0	Board	0															
TD		TD		TD		TD		TD		TD		TD		TD																
calc		calc		calc		calc		calc		calc		calc		calc																
1	698	1	1	100	300	1	1	750	300	1	3	1	1400	1	2	260	1000	1	5	400	400	1	5	400	400	1	3	0	1400	1

- > Spectra loaded into MATLAB using DOOCS addresses.
- > Buffer created to store spectra.

- > Spectra loaded at 10 Hz frequency.
- > Data saved to time-stamped file when buffer full and oldest file deleted.

Noise spectrum from a beam position monitor



The image shows two windows from the LILI GUI. The main window, titled 'LILI', displays a timer with the following values: Time: 00:26:54, Started: 00:26:31, Run: 00:00:23, and End In: 00:00:37. It includes 'Start' and 'Stop' buttons. The 'Plotting P...' dialog box is open, showing 'Buffer Size: 300', 'Run Time: 100', and 'No. of Files: 4'. A 'Run' button is at the bottom of the dialog. Orange arrows connect text boxes to specific GUI elements: 'Current time' points to the 'Time' field; 'Time current run began' points to the 'Started' field; 'Run time of tool' points to the 'Run' field; 'Countdown active after 'stop' pressed' points to the 'End In' field; and 'Number of files created before tool begins deleting oldest file' points to the 'No. of Files' field.

Current time

Time current run began

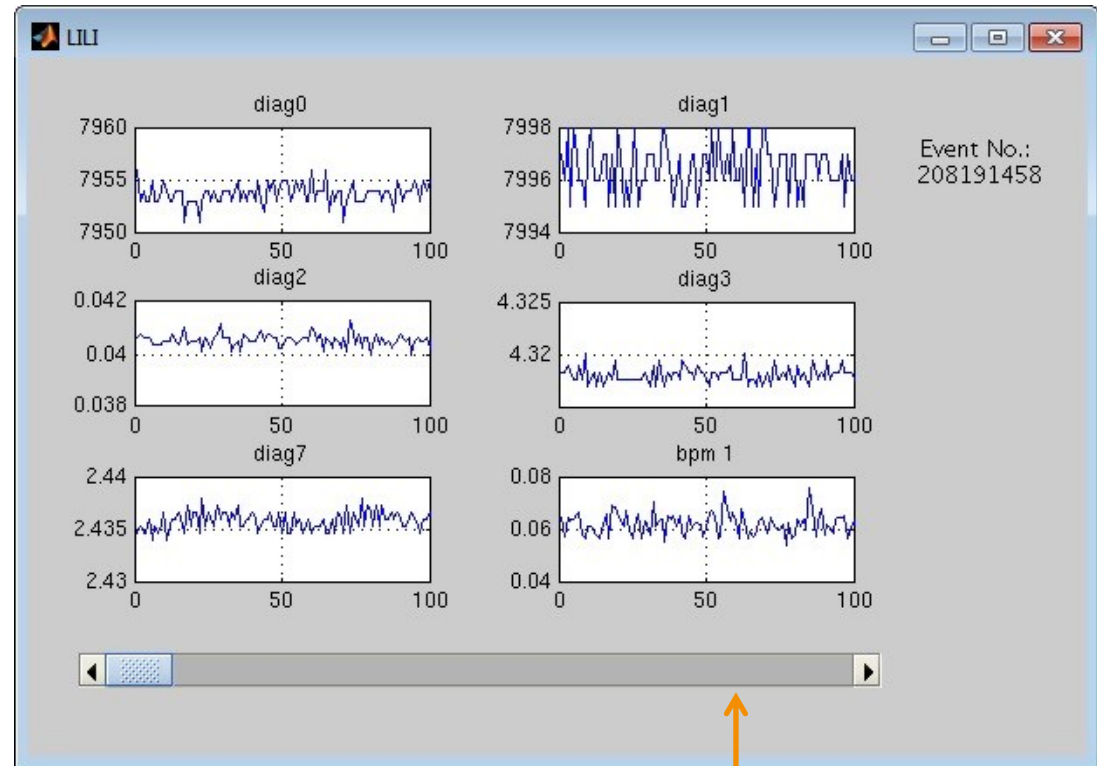
Run time of tool

- > Window created where save tool can be **started/stopped** and spectra can be **loaded**.
- > Save tool parameters can be chosen.
- > When **'stop'** pressed, program runs until buffer full with countdown active.

Countdown active after 'stop' pressed

Number of files created before tool begins deleting oldest file

- > Data can be loaded using **event number drop down list** or
- > Individual spectra can be **loaded from file.**
- > Spectra are plotted in new window with x-axis time-scroll and the event number associated with the spectra displayed.



6 spectra from 6 different ADC addresses, showing zoom of x-axis (0-100, max 2048)

Scroll allows movement along x-axis

> Save Tool:

- Second save tool, online and only saving IL events:
- **Two-level threshold** (above and below noise)

or

- **Signal analyser** (watches for IL spikes).

> GUI:

- Further functionality with second save tool (online plotting, last IL event button).
- More plots from more detectors.
- ‘Stop’ button modification.

Thank you for your attention!

