XAL Status

Thomas Pelaia II

ICALEPCS 2007

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Active XAL Developers

- **Christopher Allen**

- **Chungming Paul Chu** (Stanford Linear Accelerator)

- **Sarah Cousineau**

- **John Galambos**

- **Jeff Holmes**

- **Thomas Pelaia II**

- **Andrei Shishlo**

- **Yan Zhang**

- **Alexander Zhukov**

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What is XAL?
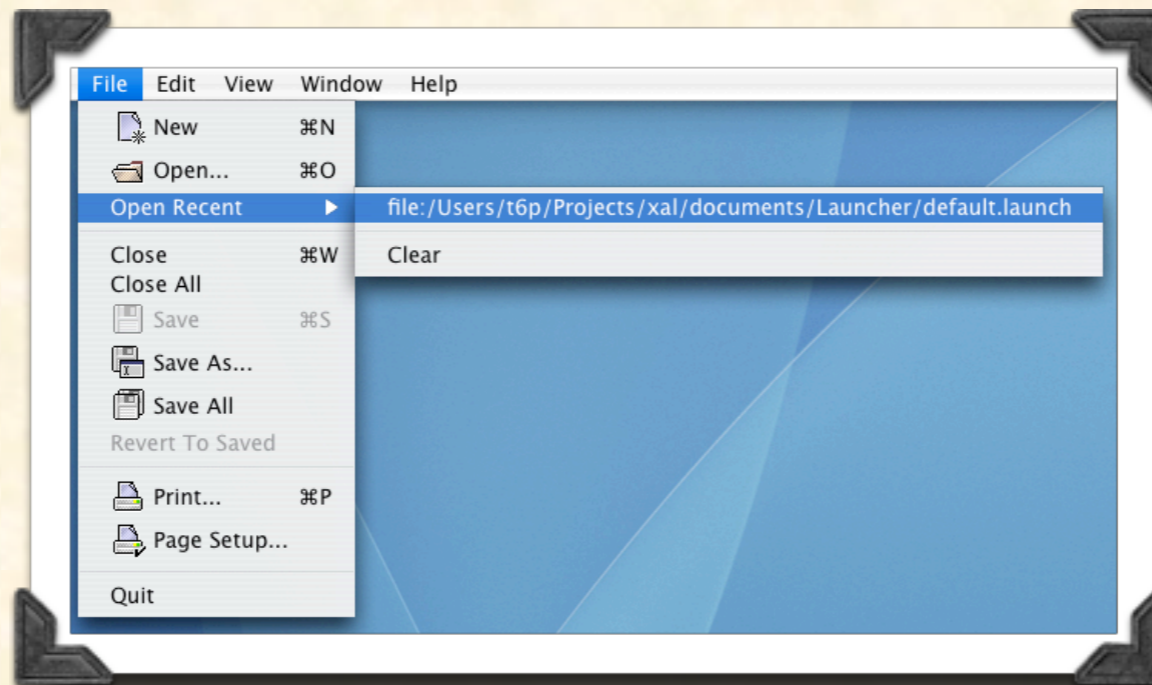
- **Infrastructure for building accelerator physics applications and scripts**

- **Collaboration among laboratories**

- **Open Source Java packages**

- **Developed for accelerator physics commissioning and studies for the Spallation Neutron Source at Oak Ridge National Lab**

- **Independent of any Integrated Development Environment (IDE)**

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XAL Toolbox

- **Several general packages** (solver, interpreter, math, …)

- **Channel access package (wraps JCA)**

- **Services**

- **Accelerator Hierarchy**

- **Online model for accelerator physics**

- **Application framework**

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Application Framework

- **Infrastructure for document based applications**

- **Common Look and Feel**
  - **Standard and customizable toolbar and menus**

- **Delivers behaviors users have come to expect**

- ***Rapid development***

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Document Based Application

- **Application Adaptor**
  - Handles application wide behavior
  - Provides application properties (name, file types ...)

- **Document**
  - Reads and writes a data archive
  - Main controller for a document window

- **Document Window**
  - Main view corresponding to a document

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Recent Application Framework Enhancements

- **Universal Copy, Cut and Paste**
  - Java drag and drop support **==** free and automatic copy, cut and paste support

- **Improved Visual Cues**
  - Menu and toolbar items gain standard icons

- **Desktop Pane Support**

- ***Bricks* User Interface Construction Application**

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Motivation for Bricks

- **Reduce threshold for creating an application**

- **Encourage Model-View-Controller (MVC) design pattern**

- **Eliminate code associated with layout**

- **No good Java tools for graphically constructing user interfaces**

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Existing Java Graphical Interface Construction Tools

- **Poor support for MVC**

- **Force you to use a particular IDE**

- **Add code complexity instead of reducing it**
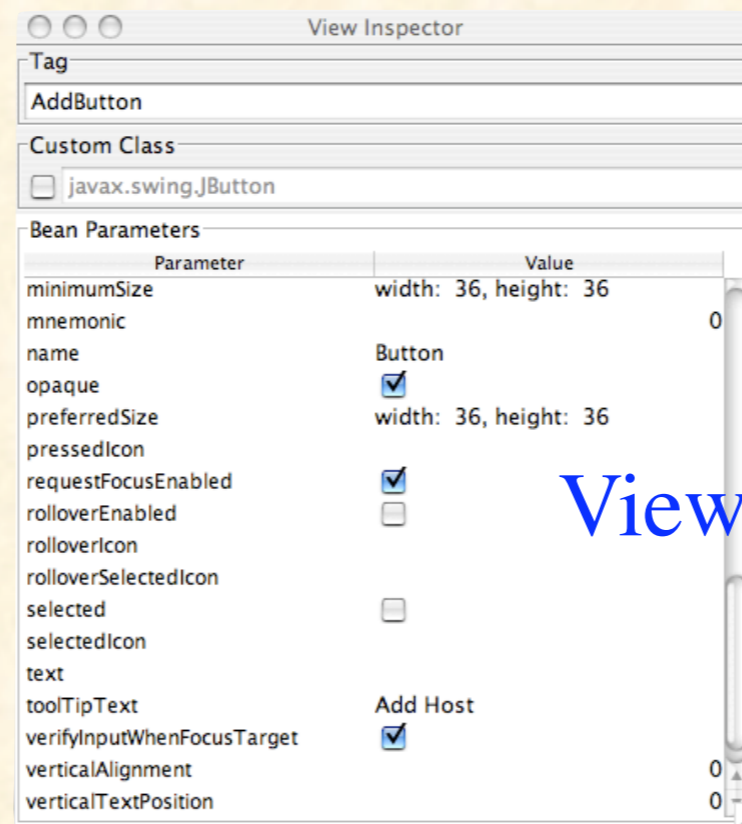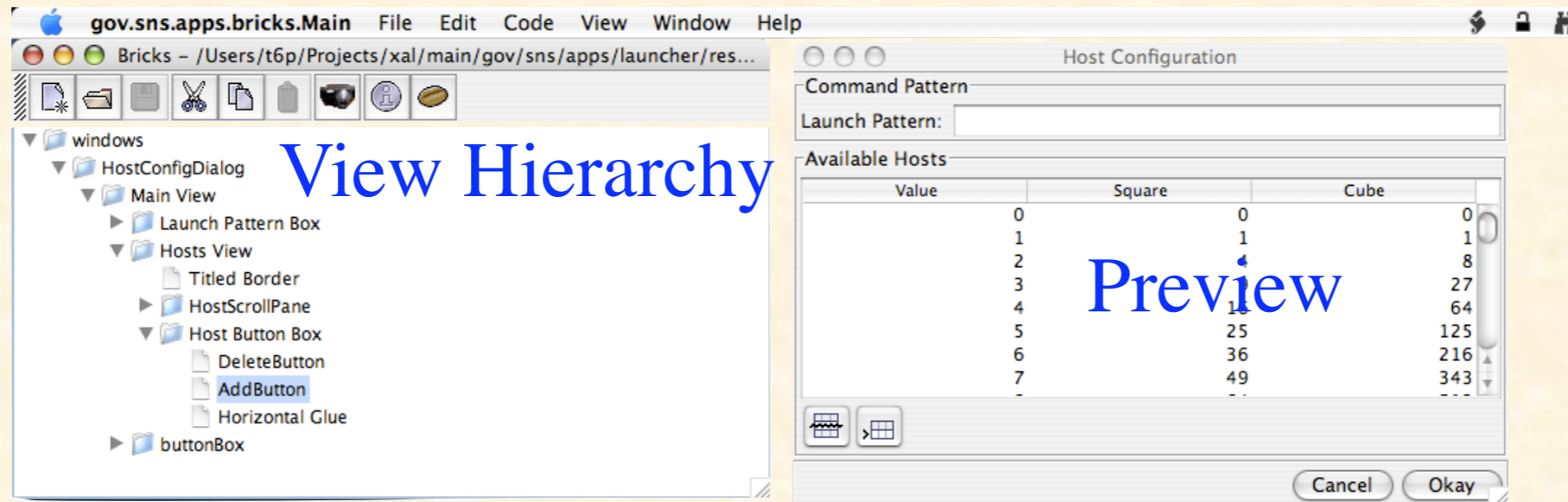
- **No support for Java based scripting languages**

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What is Bricks?

- **Application for constructing gorgeous graphical user interfaces**

- **Runtime package for instantiating graphical user interfaces**

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Bricks Features

- **Graphical layout of views**

- **Stores layout of views within an XML file instead of computer generated code**

- **Runtime package provides access to any view**
  - **Code assistant works with any IDE**

- **MVC compliance**
  - **You write code for the Models and Controllers**
  - **Bricks takes care of instantiating the Views**

- **Great for Java based scripts**
  - **No need to compile any code**

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Bricks Application

Accessing Views

- **Get a window reference to instantiate a window from a *Bricks* file**

```
dialogReference = document.getDefaultWindowReference( "HostConfigDialog", owner );
```

- **Get any view from a window reference using its tag**

```
JButton addButton = (JButton)dialogReference.getView( "AddButton" );
```
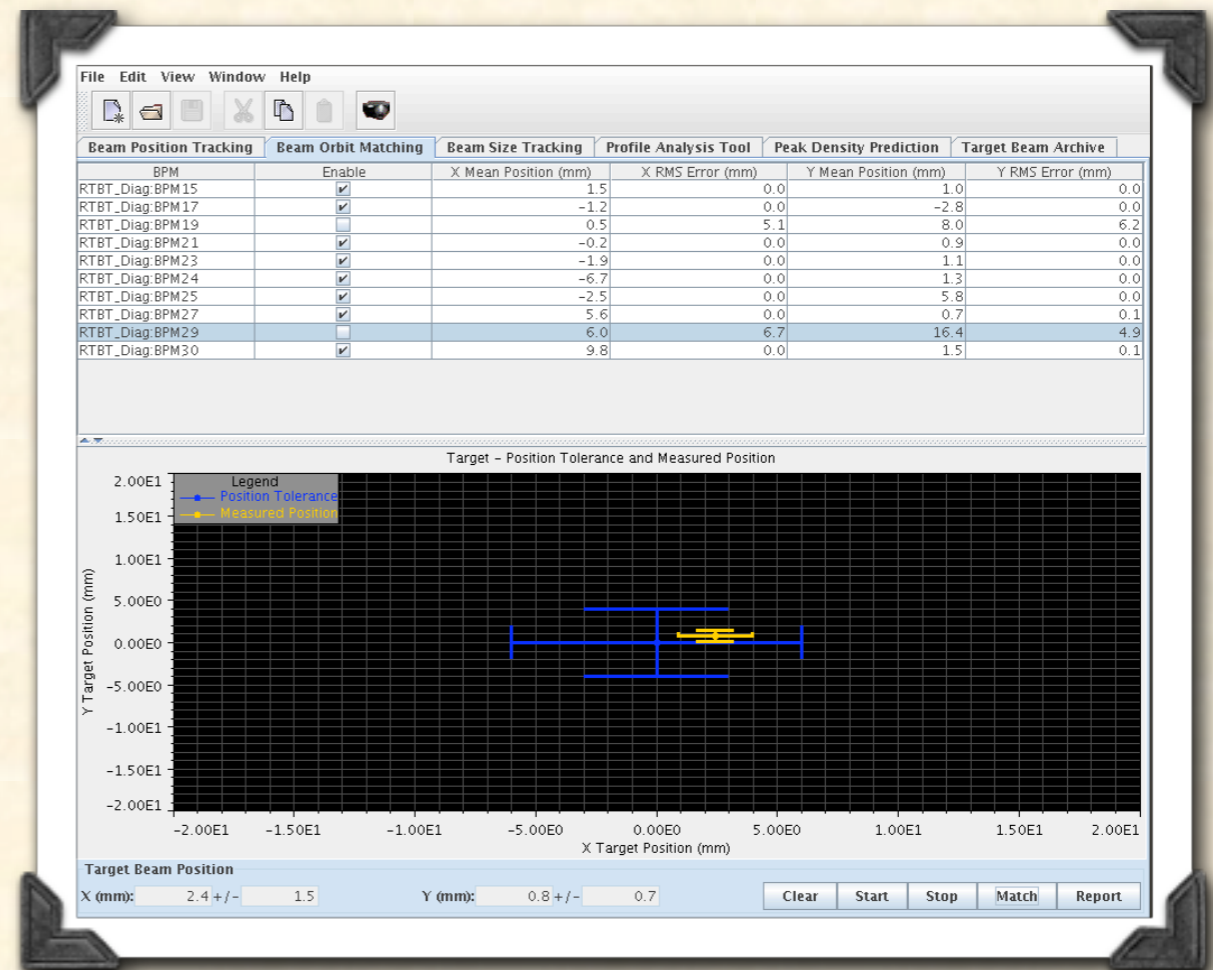
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Bricks and XAL Application Framework

- *Bricks* and the XAL Application framework can be used together or independently of each other

- Application Framework has support for *Bricks*

- *Bricks* has support for Application Framework

- You pick the technologies that work best for your application

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Applications and Scripts

- **Over four dozen applications**

- **Numerous scripts**

- **Several new and enhanced applications**
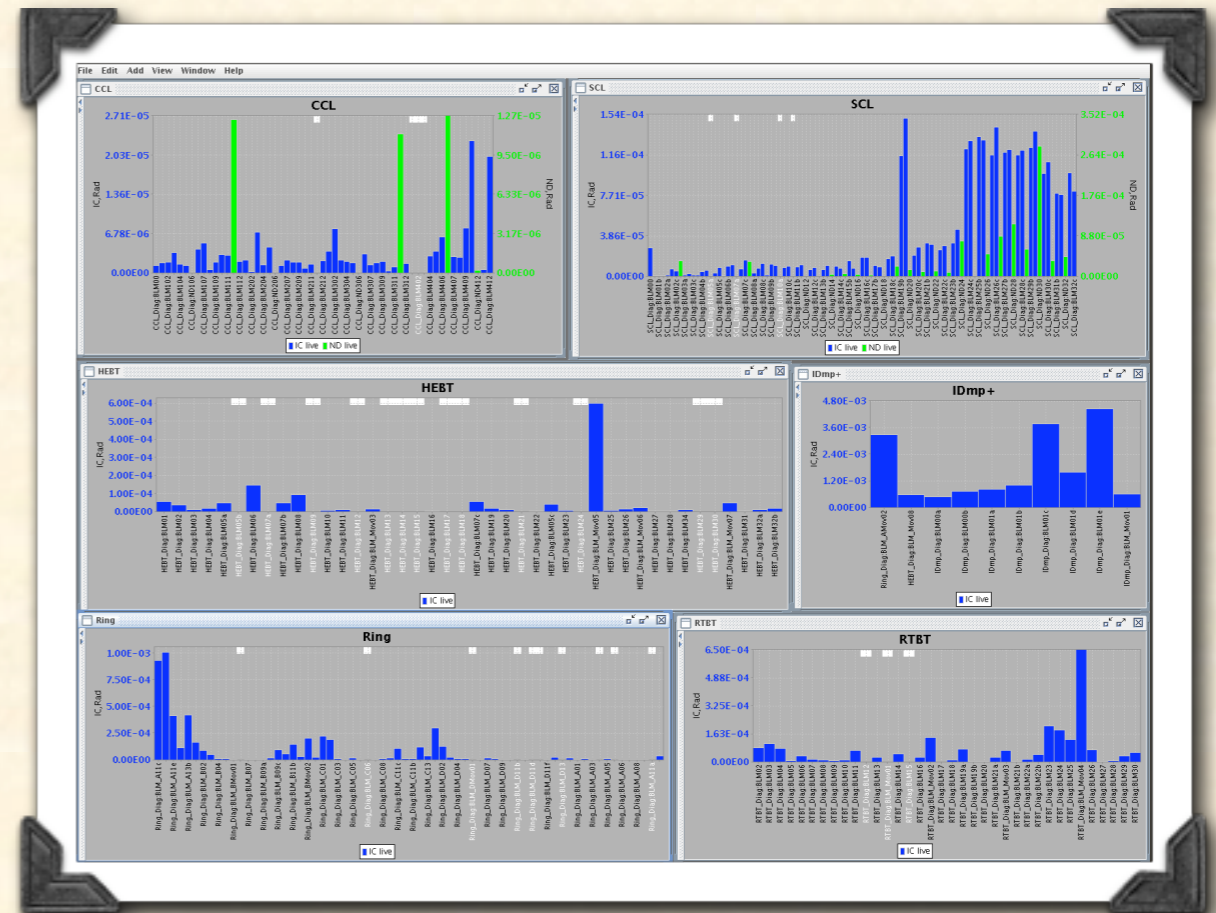
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RTBT Wizard (recent enhancements)

- **Provides tools for measuring and transporting beam through RTBT and onto the Target**

- **Improved target beam position projection and user interface**

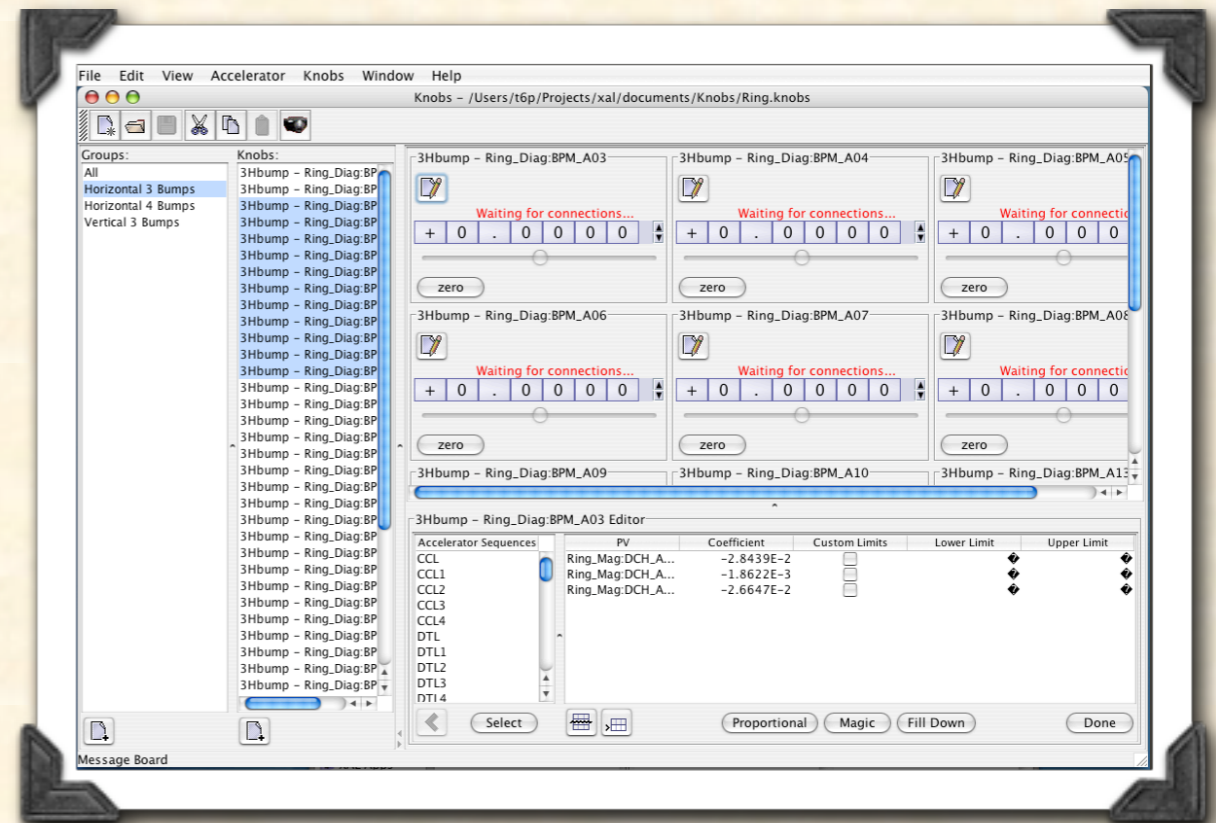- **Integrated target beam parameters report generation and browsing**

Lossviewer II (Sasha Zhukov)

- **Monitors and displays beam losses**

- **Rewritten from scratch**

- **Support for multiple types of loss detectors (currently beam loss monitors and neutron detectors)**
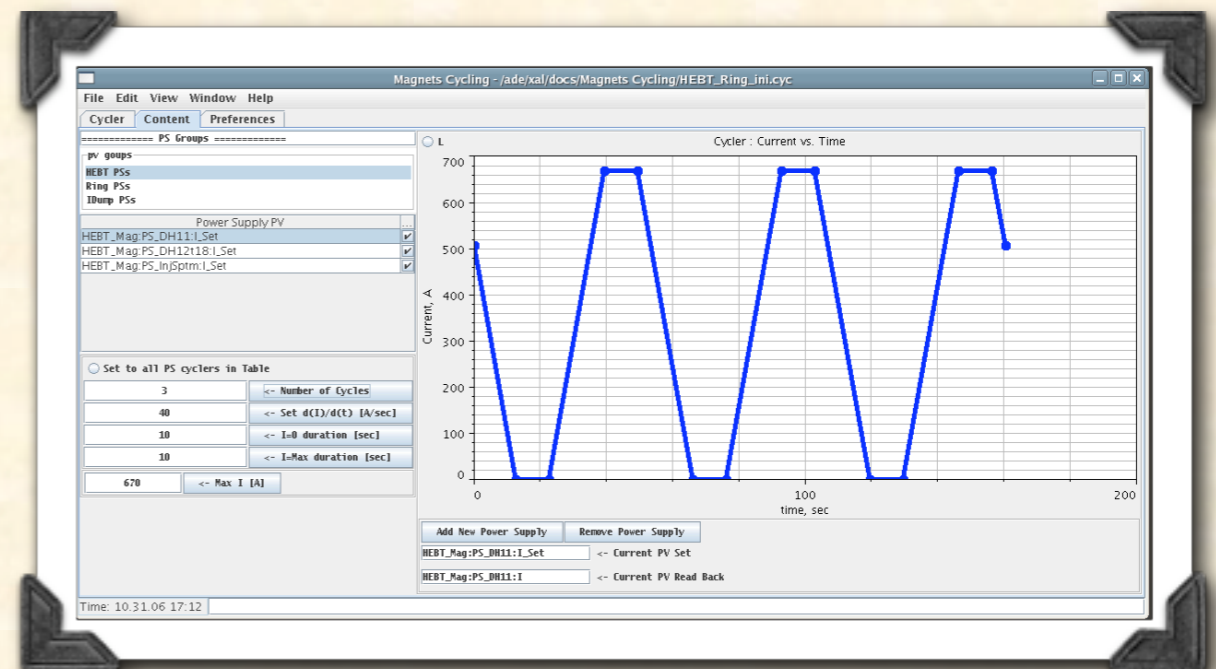
- **Consolidated display**

Knobs (Tom Pelaia)

- **Change multiple process variables concurrently with specified coefficients relative to knob value**

- **Users can define multiple knobs and group them within a document**

- **Knob coefficients set either manually or with automated tools**

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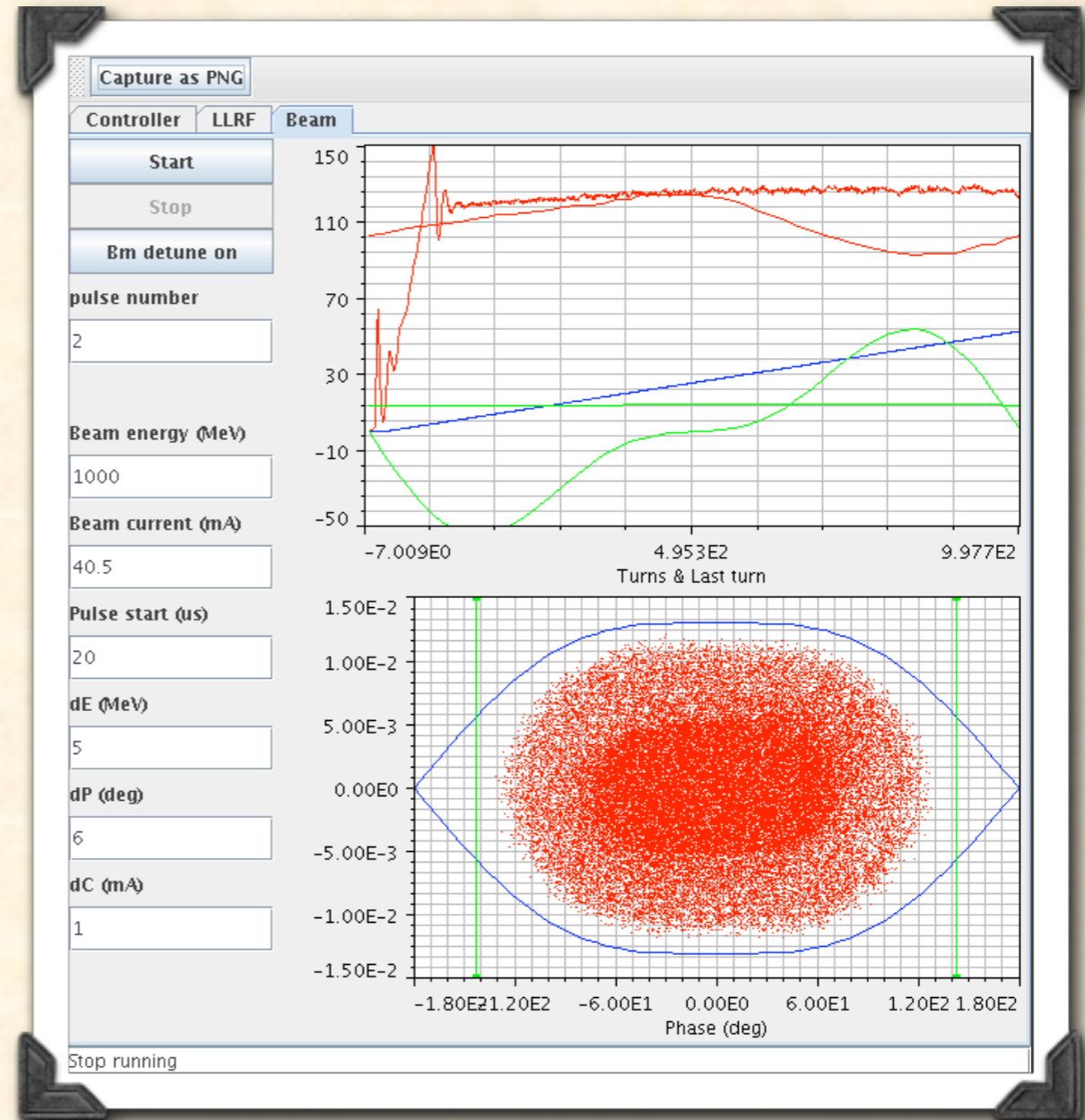SPALLATION NEUTRON SOURCE

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Magnet Cycling (Andrei Shishlo)

- **Convenient way to cycle bend magnets to remove hysteresis effects**

- **Individual magnet configuration of cycling properties including number of cycles and dwell times**
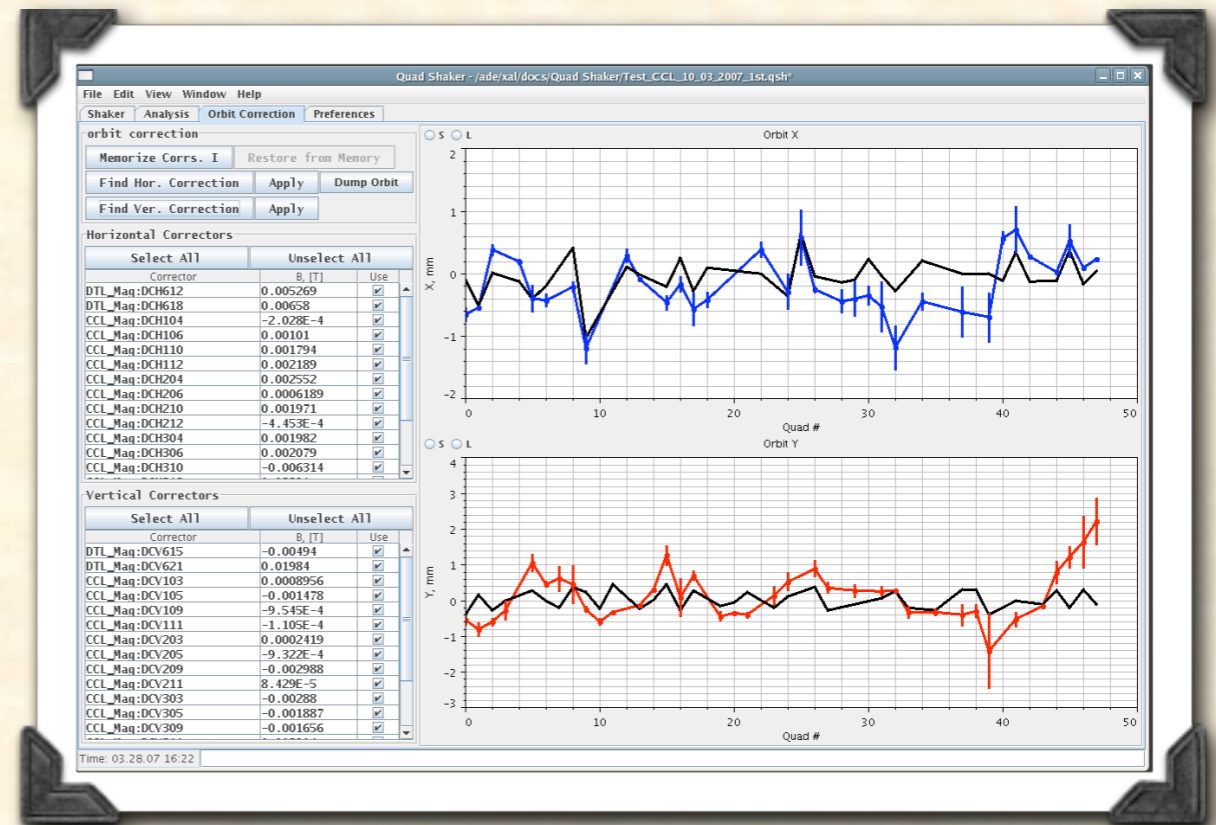
RF Simulator (Yan Zhang)

- **Simulates both the RF controller and beam in the ring.**

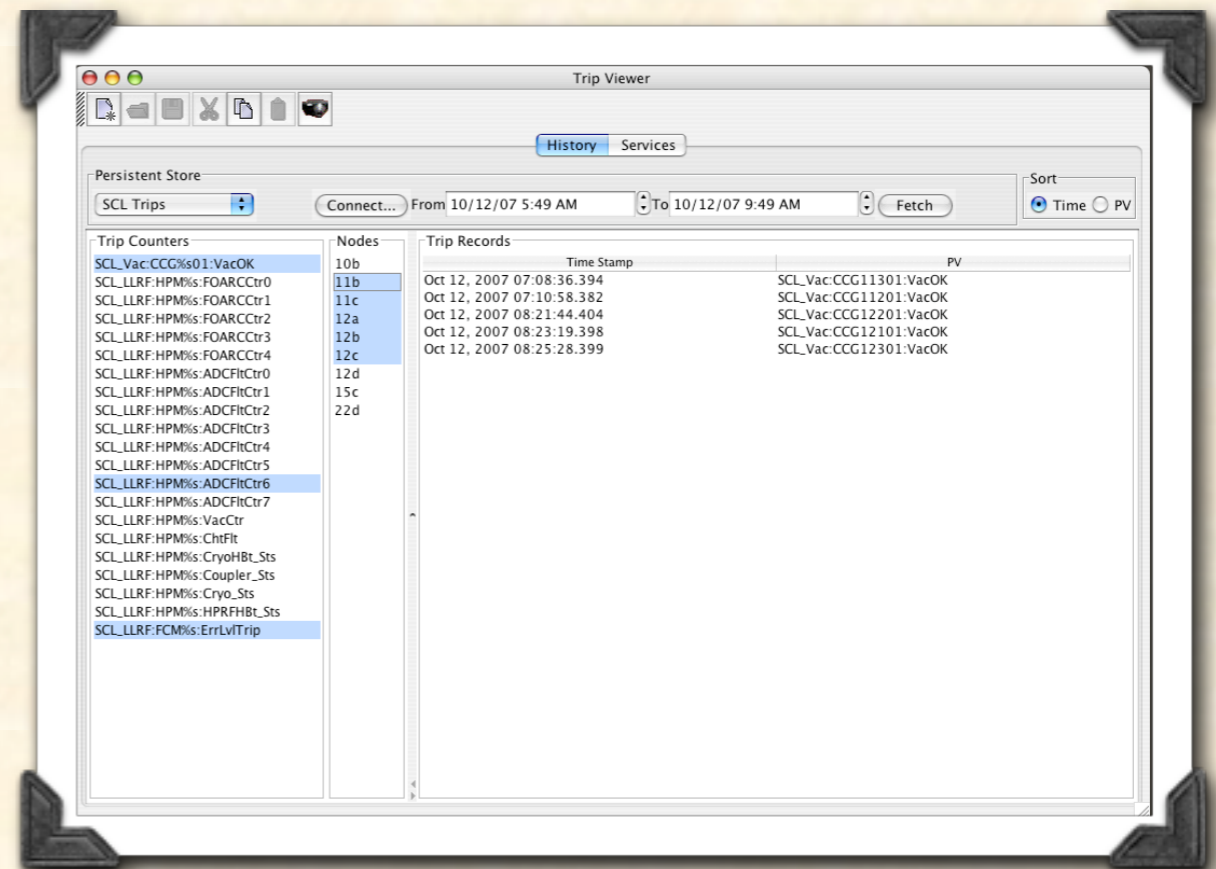- **Mimics beam loading and RF feed-forward and feedback processes**

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Quad Shaker (Andrei Shishlo)

- **Measures beam position relative to quadrupoles**

- **Determines quadrupole misalignments**

- **Corrects beam position relative to quadrupole centers**

Trip Monitor and Viewer (Tom Pelaia)

- **Service to continually monitor trips**

- **Logs trips to database**

- **Application manages service and browses historical trips**

Collaboration

- **XAL has been an open source, collaborative project from the start**

- **Code contributions from collaborators around the world**

- **Fragmentation of source code among labs**

- **New effort to address collaboration**

- **http://sourceforge.net/projects/xaldev**

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Summary

- **XAL is mature with over four dozen applications**

- **Several new and enhanced applications and scripts**

- ***Bricks* allows for rapid construction of user interfaces**

- **New features for Application Framework**

- **XAL collaboration is evolving**

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