

# **Applicability of XAL for ESS**

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### Overview

**Open Source Java based Accelerator physics application framework** 

**V** Provides a rich set of applications (Orbit Correction, Wire Scanner) Analysis, Scanning Application etc.)

**M** Designed to be independent from the machine

🛓 PV Histogram - (MEBT) - Untitled.pvhist*		So Orbit Correction - (MEBT) - Untitled.orbcor*		
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- **V** Customizable through configuration files
- Provides support for control of EPICS devices



### Accelerator and Online Model

🔔 MPXMain - (M	EBT) - Untitled.mpx*						
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Trajectory	Element id="MEBT_Diag:ND00" type="Marker">						
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Result Table 2	P						
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#### Accelerator Model is the backbone of XAL framework

- Provides complete accelerator description in XML
  - list of all devices and their attributes and properties
  - devices can be grouped into logical components/sequences
  - the list of channel names for each device attribute
- XAL Applications read the model and provide access to the control system through the information in the model
- Model is generated automatically from the central database to ensure data are up to date - structure of the databse is not prescribed
  - users can adapt the XML generator to their existing databases
- Element id="ELEMENT\_CENTER:MEBT\_Mag:QH03" type="Marker"> ent id="MEBT\_RF:Bnch01:Rg01" type="IdealRfGap"> ent id="DR7" type="IdealDrift"> <Element id="MEBT\_Mag:QV04x" type="IdealMagQuad"> Selement id="ELEMENT\_CENTER:MEBT\_Mag:QV04" type="Marker"> NEW LATTICE: MEBT; NEW PROBE: by probe editor
- XAL at European Spallation Source
- SS will make use of well developed and tested framework
- **XAL** has been adapted to ESS linac model
  - XML generator queries the MySQL databse and generates the accelerator model
  - Missing lattice data are made up to allow usage of XAL at the earliest development stages

Virtual Accelerator application is used to simulate EPICS channels using CAS

The simulated channels follow physics rules applied by the online model.

✓ Online Model allows physics simulations

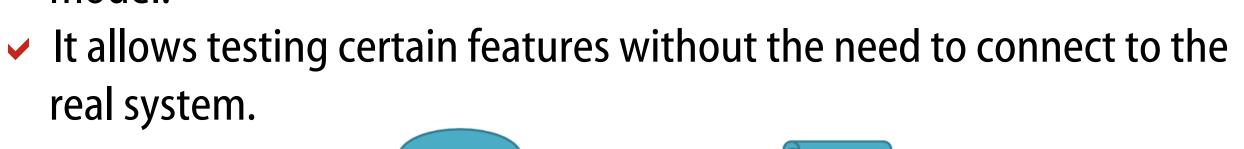
- Generated in run-time from the Accelerator Model
- Implements envelope tracker for on-the-fly beam simulations and calculation of beam parameters (i.e. twiss parameters simulation).
- Independent of XAL can be used anywhere as long as the lattice and probe information are supplied

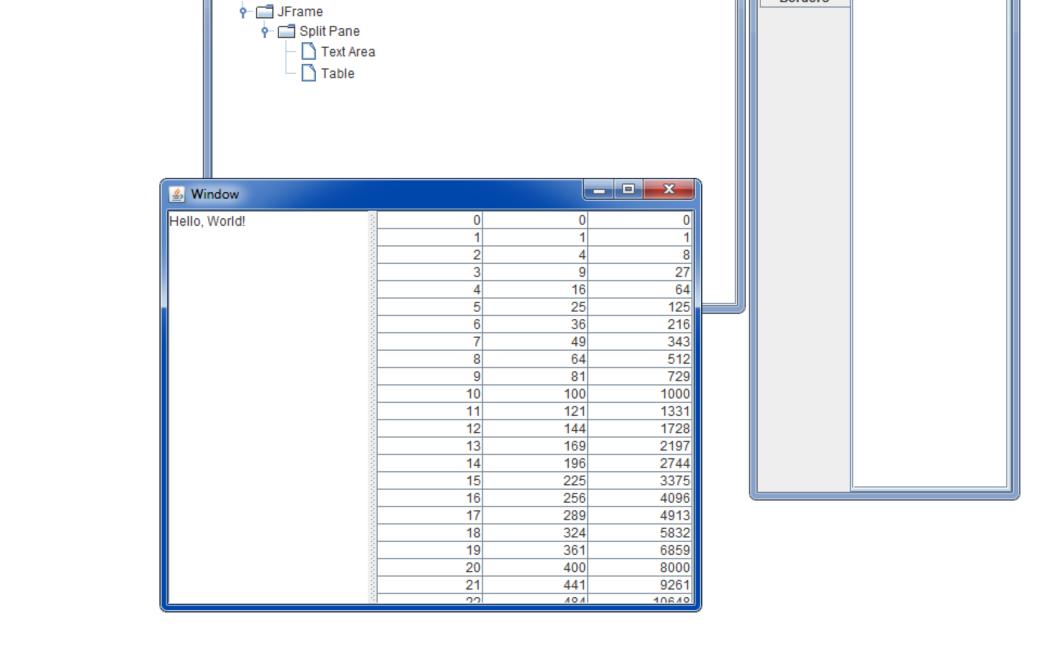
## **Application Framework**

- ✓ XAL is a framework for Rapid Application Development
- Provides a common look and feel and features
- Comes with a GUI builder called Bricks to easily create new applications

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Borders





DB to XML Generator MySQL Acc. Mode Lattice Database Configuration Files Beam parameters XAL Application device impl. etc.)

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