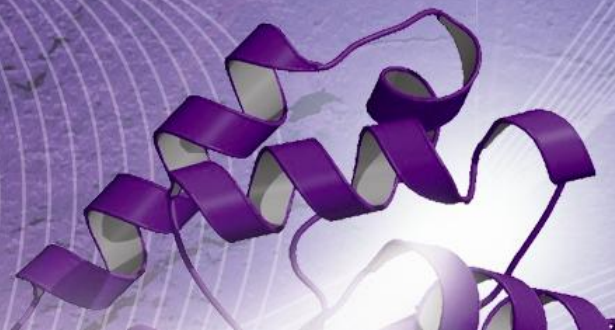
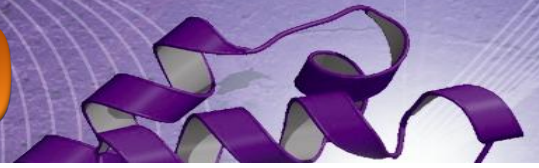


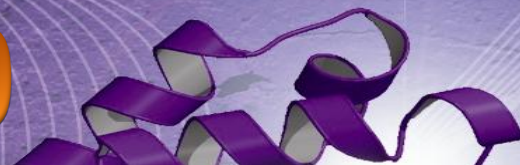
PCaPAC 2010

Opening Comments

Elder Matias



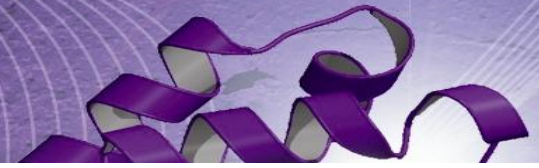
- Welcome to our attendees from: Europe, North America, Asia, the Middle East, and Australia
- Over 110 delegates/vendors



The 8th in a long series.....

- 2010 Saskatoon, Canada – (Organized by Canadian Light Source)
- 2008 Ljubljana, Slovenia – (Organized by Cosy Labs and Josef Stephan Institute)
- 2006 Newport News, USA – (Organised by Jefferson Lab)
- 2005 Hayama, Japan – (Organised by KEK and SOKENDI)
- 2002 Frascati, Italy – (Organised by INFN)
- 2000 Hamburg, Germany – (Organised by DESY)
- 1999 Tsukuba, Japan – (Organised by KEK)
- 1996 Hamburg, Germany – (Organised by DESY)

Attendees



ANKA, Argonne, Australian Synchrotron, BE/OP
Brookhaven, Canadian Light Source, Concordia
University, CPHS, DESY, Diamond, Elettra, ESRF EMBL,
GANIL, GSI Heidelberg Ion Therapy Center, High
Energy Accelerator Research Organization, IHEP, INFN,
JASRI/SPring-8, Jefferson, KEK, KIT, ISS/ANKA, LBNL,
Max-Labs, National Instruments, NSRRC, NEPTUNE,
NSCL, NSCC, Kyoto University, SAGA Light Source,
SESAME, SLAC, SPring-8/JASRI, TRIUMF, Siemens,
University of Western Ontario University of
Saskatchewan

Our Sponsors and exhibitors



cosylab 



Canadian Centre canadien
Light de rayonnement
Source synchrotron



Instrumentation
Technologies



A Phoenix Mecano Company



wie-Ne-R
Plein & Baus, Corp.

Worldwide
Industrial-
electronic
Nuclear-
electronic
Resources

 **Pro-Dex**
Accelerating Possibilities
OREGON MICRO SYSTEMS

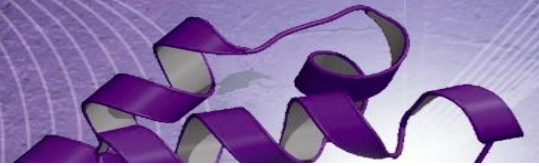


**NATIONAL
INSTRUMENTS™**

Lunch Today

- Lunch is provided at 12:00
- We will meet at 1:00 just outside the meeting room and walk down to River Landing for the Group Photo.

Tour of CLS

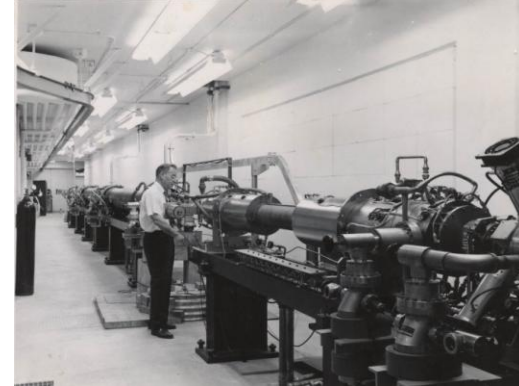


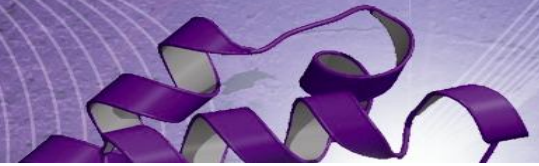
- After the poster session
- Meet in-front of the hotel at 4:15 pm,
(Saskatoon Transit Chartered Bus)
- Buses depart the CLS at 6:30 pm

- What you will see on the tour.....

Highlights/Firsts

- **1964:** Saskatchewan Accelerator Laboratory opened (Nuclear Physics).
- **1999:** Formal funding announcement by CFI;
Start of construction of CLS
- **2001:** Main experimental hall building is complete and ready for occupancy.
- **2002:** Start of commissioning the booster ring. (The 2.9 GeV electrons produced are the highest energy achieved by any Canadian particle accelerator.)
- **2003:** Start of commissioning the main storage ring.
 - First synchrotron light detected in the Optical Diagnostics Beamline
- **2004:** First x-rays detected in the SGM Beamline.
 - Commissioning of the storage ring is completed.
 - First experimental data recorded on the SGM Beamline.
 - Official Grand Opening.
- **2005:** First synchrotron user!!
- **2006:** First publications based on CLS data.





- 45+ Telemecanique Momentum PLCs
- 9 Siemens S7 300/400/400 F PLCs
- 40+ VME Crates & 1 VME Crate
- 80+ IOC for Serial Communication
- 1100+ Stepper Motors
- 10 Servo Motors
- 20+ Operator Workstations

(<http://www.lightsource.ca/operations/controlinstrumentations.php>)

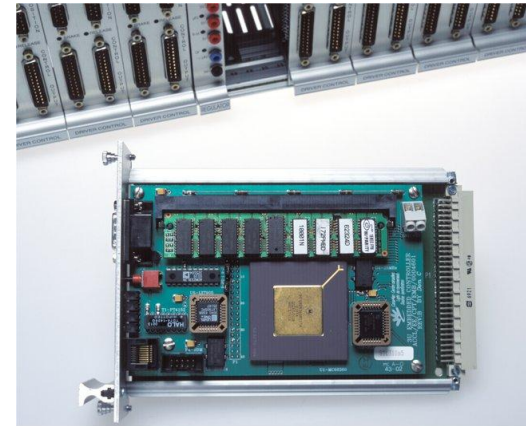
Control Room/Areas

- Quad Headed Scientific Linux workstations in the accelerator control room and Dual Headed workstations on the beamlines.
- Scientific Linux (CERN/Fermilab)
(<https://www.scientificlinux.org/>)
- **Human Factors Engineering**
- EPICS Tools
 - EDM (Display Manager)
 - Strip Tool (Data Trending)
- CLS Specific
 - Audio Alarm Annunciation
 - Legacy hard-wired controls from older Linac Equipment



Control Hardware

- Common EPICS control system for machine and beamlines
- OPI
 - Scientific Linux with EDM screens
- Scripting
 - Matlab and CERN Root
- IOC
 - RTEMS or Linux
 - using single board computer or
 - industrial PC with fibre optic links
- PLC
 - Telemecanique Momentum
 - Siemens S7/300, S7/400 and S7/400 F
- Relational Database
 - MS-SQL Server



- Applications:
 - Lockup system (ACIS)
 - Oxygen monitoring
 - BMIT human studies (TBD)
- IEC 61508 – SIL 3 based system
- Siemens S7/400 F
- Redundant Second Chain
- Fail-safe design
- Independent Verification

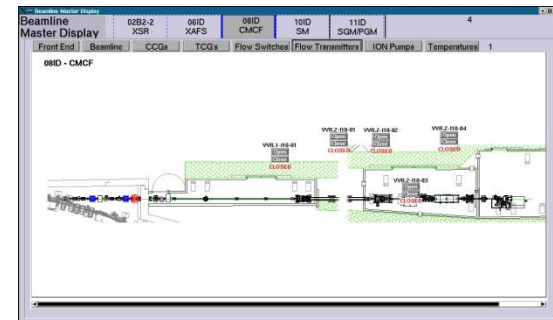


Motion Control

- MaxV VME Controllers
- Power Electronics (Parker + others)
- Software/Hardware Multi-Axis Control
- Average Beamline 50-150 motors

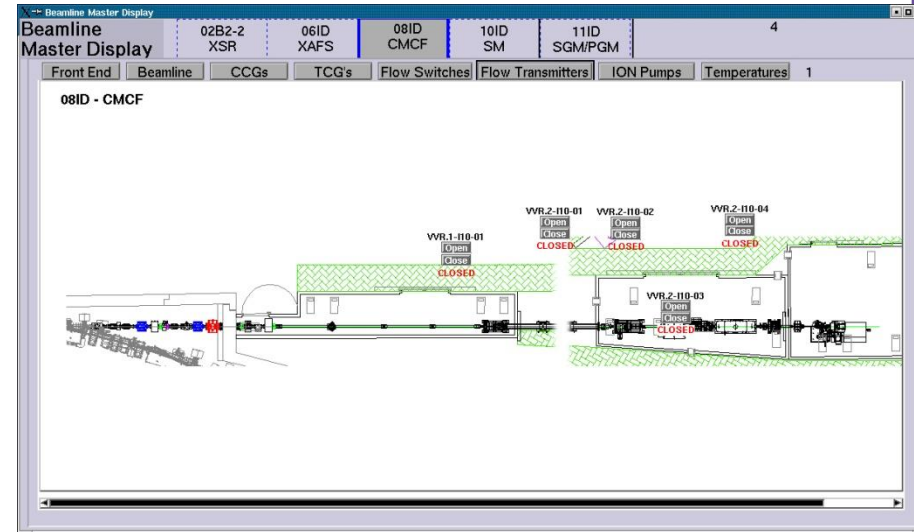


- Beamline Controls are based on the same software and hardware as the accelerator systems.
- Each beamline is on a separate virtual network.
- The EPICS Gateway provides links between the different networks.
- Matlab, Python, spec are used for scripting.
- Users and experiment accounts are (NFS or samba) mounted off a central SAN.



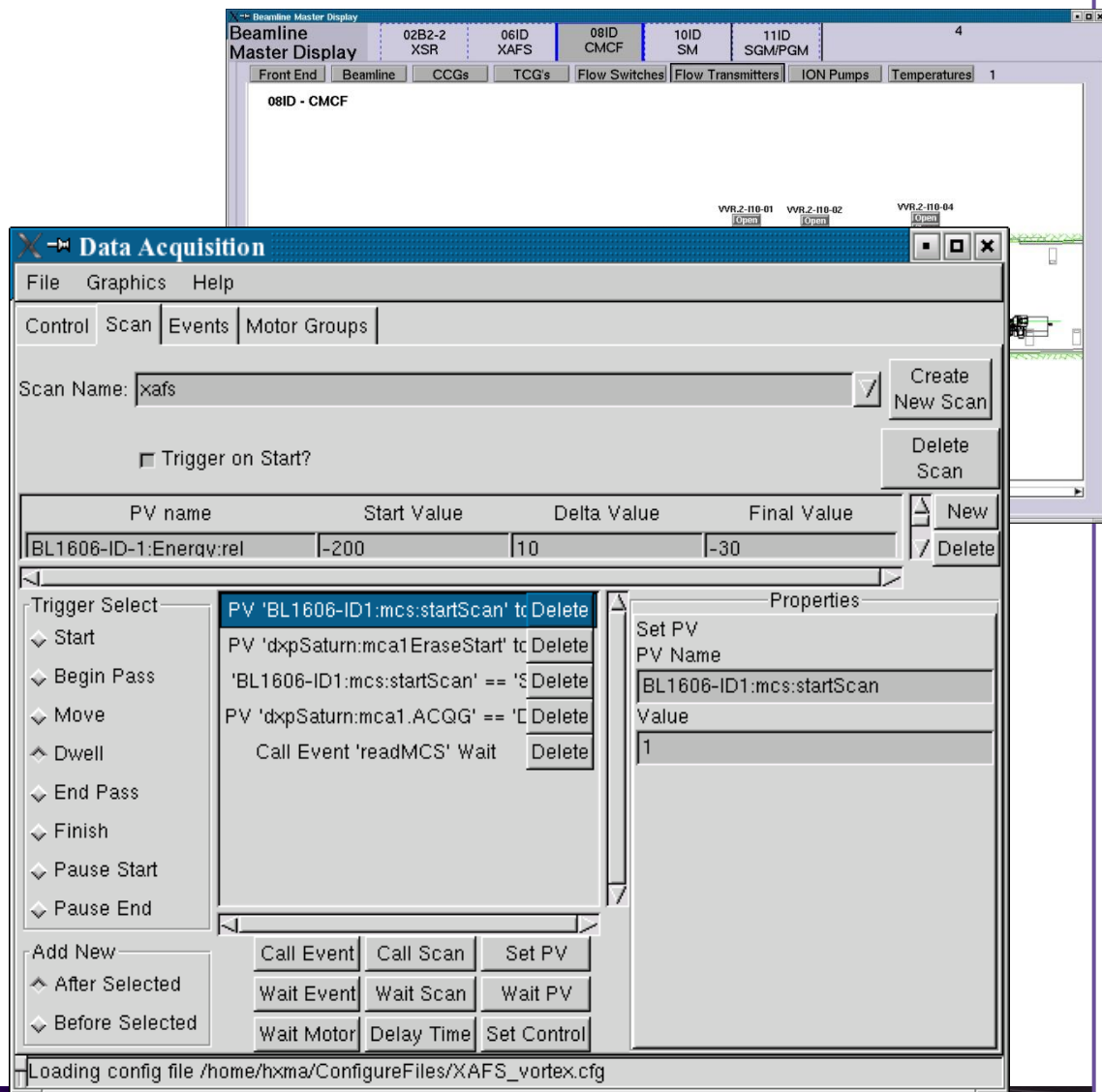
Beamline Controls Interfaces

- EPICS Tools
- Configuration Tool
- User GUI & ROOT



Beamline Controls Interfaces

- EPICS Tools
- Configuration Tool
- User GUI & ROOT



Beamline Controls Interfaces

- EPICS Tools
- Configuration Tool
- User GUI & ROOT

The image displays two overlapping software windows from the Canadian Light Source beamline control system.

Beamline Master Display (Background Window):

- Menu: File, Graphics, Help
- Control: Scan, Events, Motor Groups
- Top Bar: 02B2-2 XSR, 06ID XAFS, 08ID CMCF, 10ID SM, 11ID SGM/PGM, 4
- Sub-window: 08ID - CMCF
- Buttons: Front End, Beamline, CCGs, TCGs, Flow Switches, Flow Transmitters, ION Pumps, Temperatures, 1
- Right side: VWR.2-110-01, VWR.2-110-02, VWR.2-110-04 (Open)

CLS IDA Main Control Panel (Foreground Window):

- Menu: File, Edit, Plot, Help
- Buttons: Move Motors, Scan Motors, Energy Calibrate, Detectors, Acquire, Quit
- Parameters:
 - Idiode: 0.004 V
 - IO: 0.622 V
 - Iup: 1.010 V
 - Idown: 0.907 V
- Check Beam Status (Orange text)
- MONO Position: 13382.94
- Output File: Output File
- Vacuum Valves: All Open
- Front End Shutter 1: OPEN
- Front End Shutter 2: OPENED
- Safety Shutter: OPEN
- POE Photon Shutter: CLOSED
- Current Scan Progress: 1%
- Mono Active: (radio button)
- Acq Active: (radio button)
- Current Scan: 0 of 1
- Current Time: Thursday 15:34:38
- Finish Time: (empty field)
- Buttons: Pause, ABORT

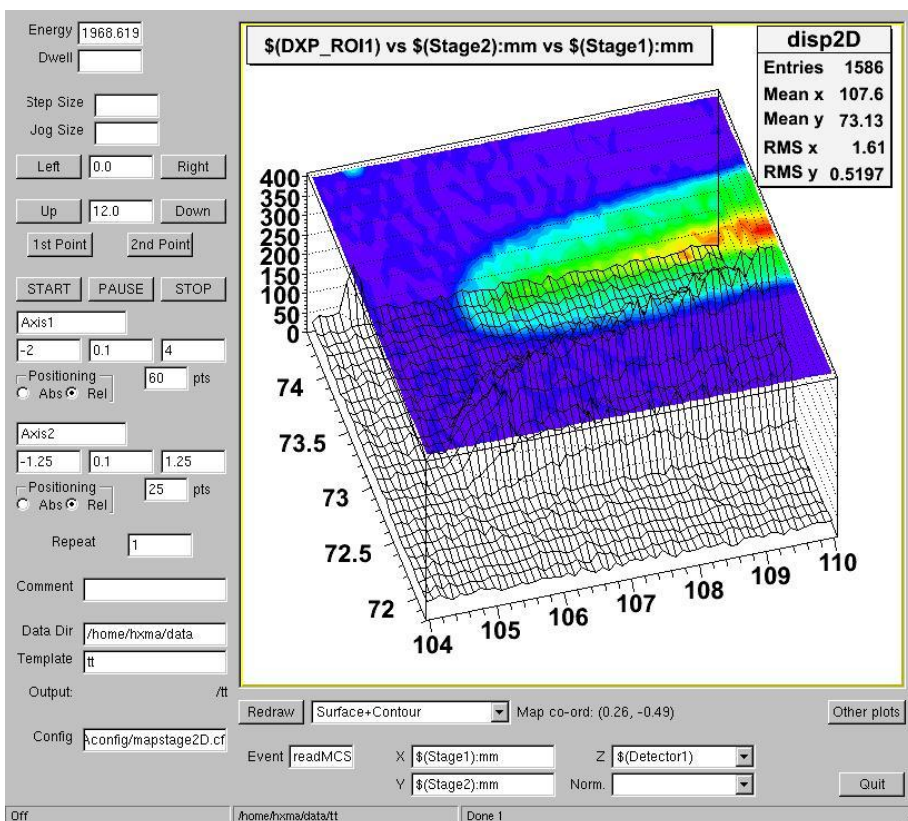
Data Acquisition Window (Overlaid on CLS IDA):

- Menu: File, Graphics, Help
- Buttons: Create New Scan, Delete Scan, New, Delete
- Delta Value: 10, Final Value: -30
- Properties:
 - Set PV
 - PV Name: BL1606-ID1:mcs:startScan
 - Value: 1
- Buttons: Set PV, Wait PV, Set Control
- File: S_vortex.cfg

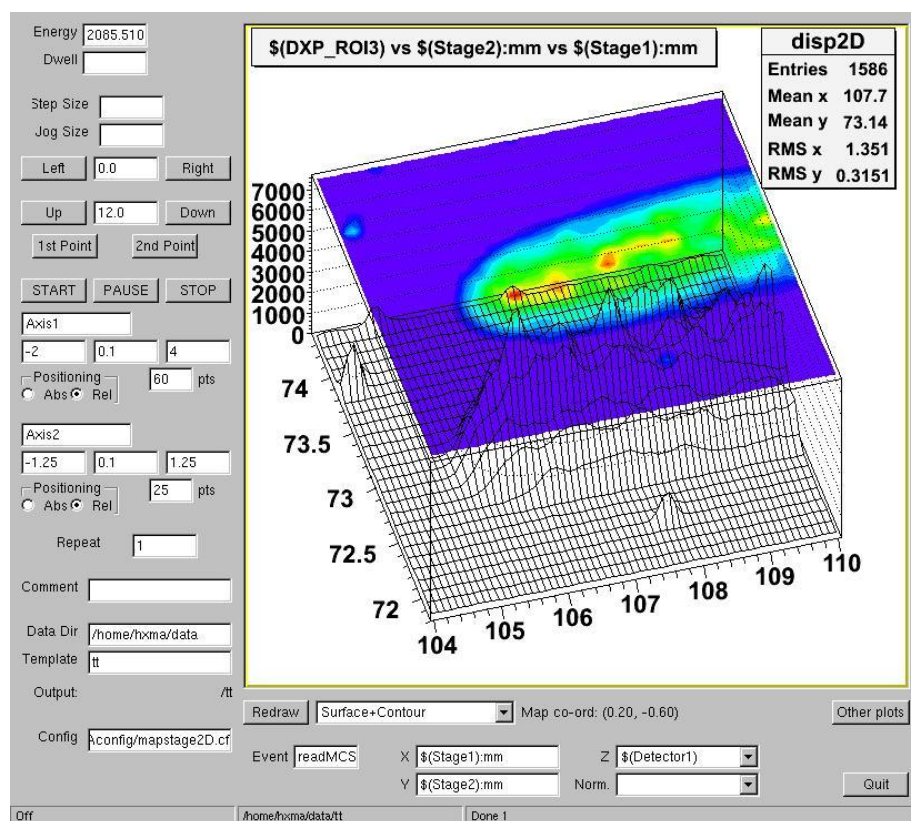
www.lightsource.ca

Beamline Visualization

- Raster scan with fluorescence spectroscopy of a pine needle contaminated with arsenic. The technique allows multiple elements to be detected simultaneously at each point of the raster. These images show distributions of arsenic, iron, and manganese, respectively, near the tip. The highest intensity displays in red, lowest in blue.
- Custom on-line plotting application scripted in CERN Root, with data stream from the CLS data acquisition application.
(G. Wright, R. Igarashi, K. Chang-Yong, N. Chen)

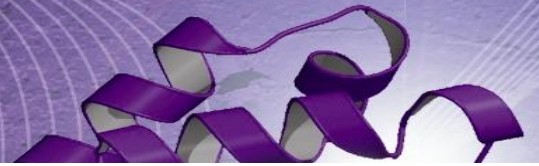


As Map



Fe Map

Higher Level Tools



Full Support:

- EDM
- CLS Scanning Tool
- Qt (C/C++)
- Root
- Matlab
- Java
- Synapps
- CSS

Partial Support:

- Spec
- Labview
- Python
- Tcl/Tk
- Python
- MEDM
- synapps