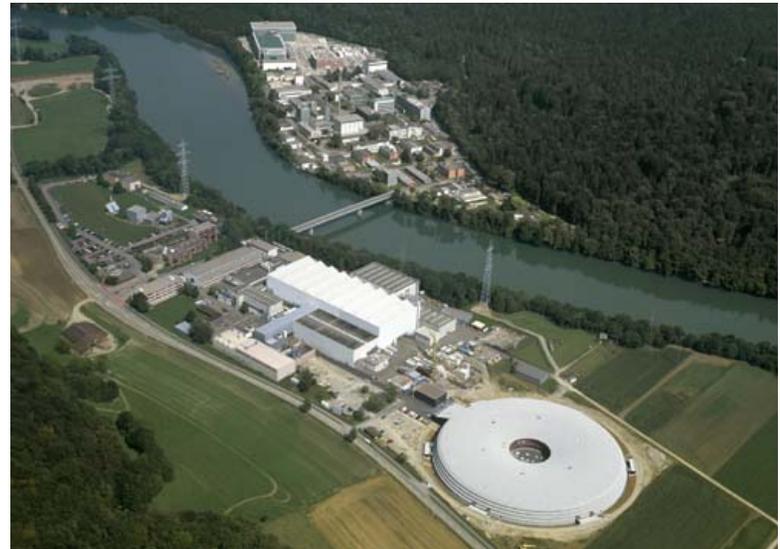


PSI Status

- **PSI Facilities and future projects**
- **Status of facilities**
- **Controls @ PSI**
- **Controls status and activities**
- **Conclusions**



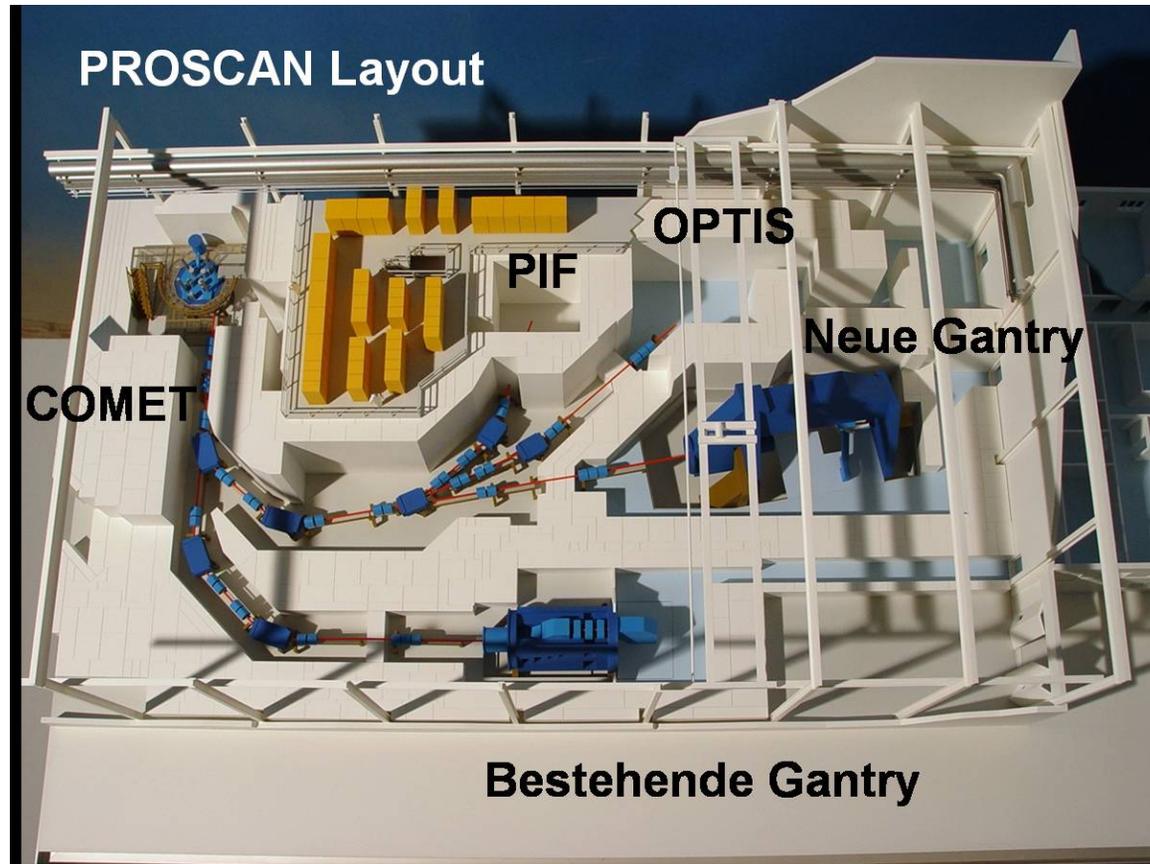
PSI Facilities and projects

- **SLS (Swiss Light Source)**
 - 3rd generation light source, 2.4 GeV
 - **PROSCAN**
 - 250 MeV compact superconducting proton cyclotron dedicated for cancer therapy
 - Four beamlines for therapy stations (one for materials irradiation)
 - **High Intensity Cyclotron**
 - 590 MeV, high beam intensity cyclotron
 - 2 mA, 1.2 MW continuous beam power
 - **PSI FEL project**
 - “Compact” FEL, affordable for a (Swiss) national budget
 - 250 MeV pre-accelerator building to start soon
 - Some R&D projects already ongoing (e.g. low emittance gun)
-

Operation status (SLS)

- **SLS machine already more than 5 years in user operation**
 - **12 (+2) beamlines in operation, 5 “coming soon”. Total = 19**
 - **Femto (pulse slicing) beamline/experiment**
 - **In 2006, 6768 hours of operation (in total), 95% availability**
 - **Downtime dominated by a few larger incidents (not controls related)**
 - **Stable operation of**
 - **top-up, filling pattern feedback (still developing it further)**
 - **Fast (and slow) orbit feedback**
 - **longitudinal feedback was taken into operation**
 - **integrating X-ray BPMs into global feedback**
 - **First controls (diagnostics) upgrades are in planning**
 - **Fast Orbit Feedback, BPM electronics**
-

PROSCAN facility



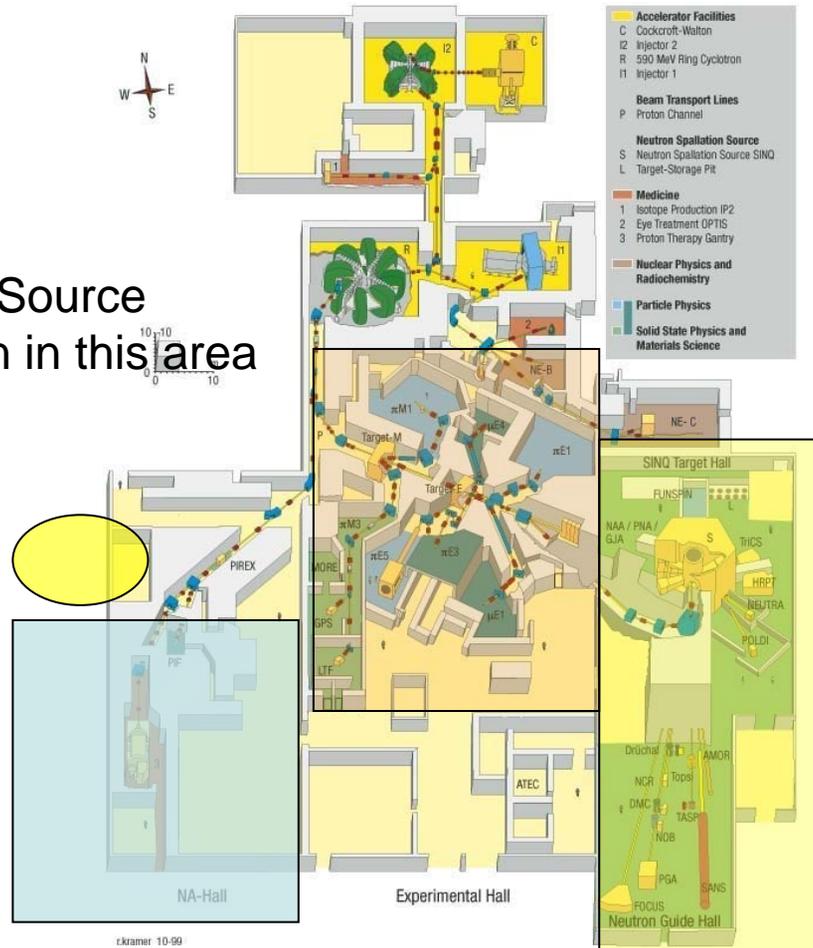
Operation status (PROSCAN)

- **Started patient operation in February ('07) with existing Gantry 1 connected to new accelerator**
 - **Preparing for Optis2 (Eye tumor therapy)**
 - **Will be added in June (Short shutdown)**
 - **Will be the first EPICS-controlled component**
 - **New facility: Gantry2 (advanced scanning technologies) also in construction**
 - **Commissioned with PSI in-house developed controls software**
 - **Preparing for move into EPICS (more about this later) for the machine control**
 - **Due to special (regulatory) requirements, therapy steering software is non-EPICS**
 - **Extensive hard- (and firm-) ware based safety system, independent of controls**
 - **Later the facility is planned to be operated without shutdowns all over the year (except nights and weekends)**
 - **Breaks should not be longer than 3 days**
-

PSI 590 MeV Cyclotron

UCN
 Ultracold Neutron Source
 Under construction in this area

PROSCAN
 now housed
 in this area



Muon, pion beam lines

SINQ
 (Spallation neutron source)

Operation status (high intensity cyclotron)

- **590 MeV, 2 mA (1.2 MW continuous beam) Cyclotron (no special name)**
 - **Megapie experiment completed in December '06**
 - **Liquid metal (lead) target, for ADS, waste treatment and as a high-yield target**
 - **60% better neutron yield than with a solid target**
 - **Preparing for new ultracold neutron source operation (“fast” beam switching to target)**
 - **Beam current upgrade 2 -> 3 mA (and higher) in progress**
 - **Controls hardware upgrade (standardization) in progress**
 - **CAMAC -> VME64x, a small number of crates already in operation**
 - **First major replacements in beginning of 2008 (yearly shutdown)**
 - **Slowly replacing power supplies**
 - **New local controller for old (analog) power supplies (“MultiIO”)**
 - » **Controls interface identical to the digital PS**
 - » **Improved resolution and stability**
 - » **Possibility for local fast feedback (for stabilization)**
 - **Now, about 90 CAMAC crates, expected to have ~60 VME crates**
 - **Will also be migrated to EPICS**
 - **Hardware upgrade is a pre-condition (no sense in rewriting drivers for the old HW)**

PSI-FEL Project

- **Design target**
 - **“Compact” FEL**
 - 800 meters long, 5.8 GeV beam energy
 - 100 Hz (probably) repetition rate
 - High brilliance through low emittance
 - » Low emittance gun (LEG)
 - » Preservation of emittance in acceleration
 - **Pre-accelerator**
 - Building starts soon
 - » Simple building, to finish in about one year
 - Demonstration of the pre-injector performance until ~2010
 - **Main project starts after (and if) the design targets are achieved with the preinjector**
 - **Has been designated a “Project of national importance” by the Swiss science coordinating authority (ETH-Rat)**
-

Controls (section) @ PSI

- **38 persons (presently)**
 - **for 3 operating (large) facilities, 19 beamlines and one major project**
 - **a large contribution from other groups (user self-help) is essential**
 - **Cannot expect a major growth in manpower**
 - **Proton facilities will be converted to EPICS (will take time)**
 - **To be able to cope with this, the section will be reorganized (not yet officially approved)**
 - **Presently 3 groups, new: 5 groups, none facility-specific**
 - **Embedded SW, Controls IT, Hardware, Common Apps, Experiment support**
 - **Motivations for the change:**
 - **try to use manpower efficiently**
 - **eliminate duplication of efforts (through standardization)**
 - **concentrate similar skills**
 - **know-how accumulation and consolidation**
 - **make groups more transparent to users and other collaborating groups**
-

Controls status

- **Currently still using mainly EPICS 3.13.10**
 - **Preparing for migrating (VME) to 3.14. (already a lot of 3.14 soft IOCs)**
 - **Push to have new features**
 - **Waveform size limitation in 3.13 is a problem (for example)**
 - **Migrating to GeneralTime (Babak's presentation)**
 - **Beamlines**
 - **lots of diverse user devices**
 - **motor controls**
 - **Mostly OMS, but special applications increasing**
 - **Robots for sample handing are coming**
 - **Silicon pixel detectors (integration), large data rates/volumes**
 - **new network configuration (Dirk has more details)**
 - **Better structuring and partitioning of the networks**
 - **Extensive use of CA gateways, poses new requirements**
-

Controls status

- **Proton machines**
 - **preparing move into EPICS**
 - **presently homegrown software ('ACS'), too few people to support it in the long run**
 - **Lots of legacy applications and (hidden) know-how**
 - **Often their existence is only realized when there is a problem**
 - **Attempt to port some of ACS nice features**
 - **low-level channel configuration from DB**
 - **device property discovery**
 - **On-the-fly change**
 - **Should happen within the scheduled shutdowns (~3 months every year)**
 - **gateway required for applications, at least in the transition period**
 - **Replace CAMAC hardware with VME64x**
 - **standardize as far as possible**
 - **use manpower for new projects rather than reinventing things that work well**
 - **considering use of embedded devices more extensively**
 - **however, management issues have to be solved**
 - **are our management tools scaleable?**
-

Conclusions

- **PSI is very dependent on healthy development of EPICS**
 - **All our accelerators will be EPICS-based (in a few years)**
 - **try to find a balance between the sparsity of manpower for internal projects and the optimal way to contribute to the community**
-