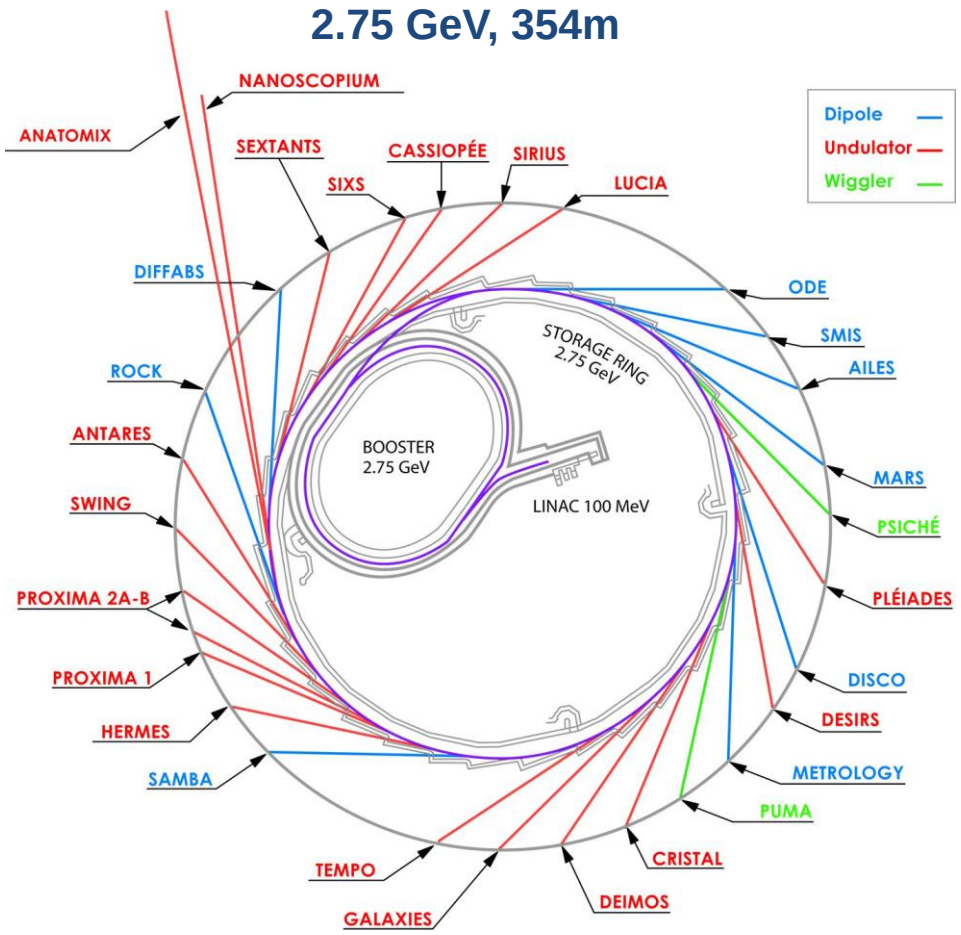
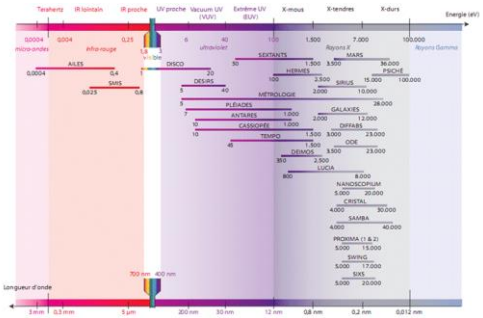
Welcome to SOLEIL

SOLEIL in a nutshell



- **29 Beamlines** :
  - ✓ 26 built in 2 phases; then 3 on project funding.
  - ✓ 24 on insertion devices; 5 on bending magnets.
- **9 orders of magnitude in energy:**



- **Support laboratories in 5 areas:** Biology (2), Chemistry (2), Surface Science, High pressure, Microfluidics.

~1200 proposals per year : ~500 accepted ;

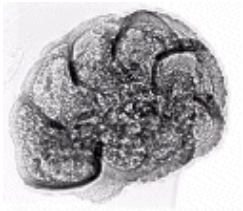
2391 unique users in 2017 from 880 laboratories (~ 10000 users from 2200 laboratories since 2008); ~ 1/3 foreign users

New Imaging and Tomography Beamlines

2017

NANOSCOPIUM

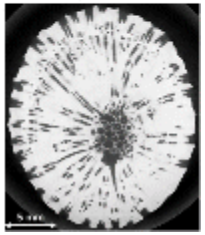
Fast multimodal 3D imaging, ptychography
High spatial resolution and analytical sensitivity



2018

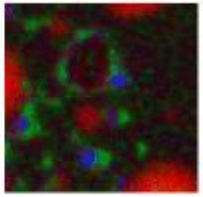
anatomix

Parallel beam microtomography
TXM



2017

HERMES

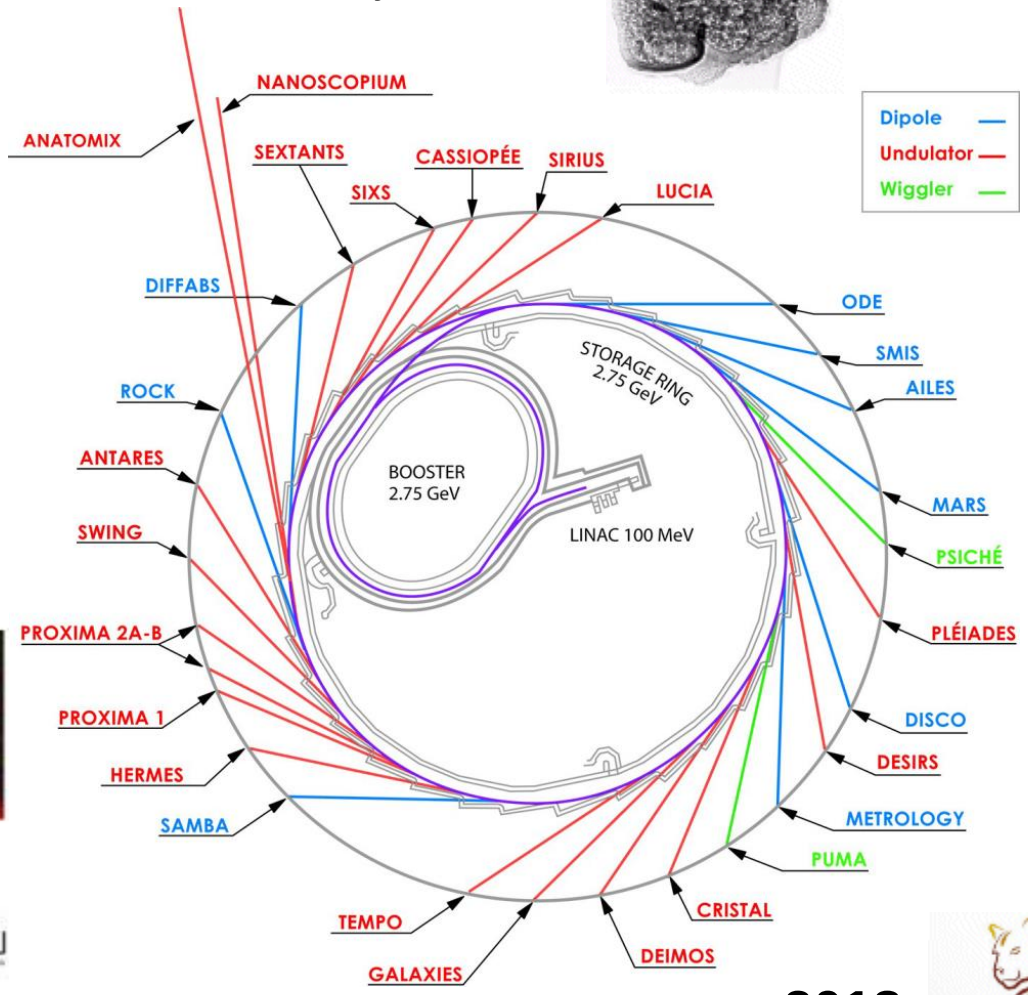


PAUL SCHERRER INSTITUT PSI

nffa.eu

STXM + PEEM
14 x 3.5 µm²
10^{12}-10^{13} Phs/s
Resolving power > 10^4

Sub-10nm resolution
(C. David)



2018

PUMA

Partnerships and Collaboration Contracts

French Universities:

Focused Partnerships:

Partnerships

ac-versailles.fr

France	109
Belgium	1
Brazil	1
Canada	2
China	1
Europe (out of H2020 projects)	4
Italy	1
Japan	2
Poland	2
UK	5
USA	2
Sweden	1
	131

Collaboration Contracts

H2020 Projects involving SOLEIL

IPERION CH

iNEXT

nffa.eu
nanoscience foundries & fine analysis

ARIES

CALIPSOplus

TOWARDS NEW INTEGRATED INFRASTRUCTURES

- Transnational Acces
- Joint Research Activities
- Networking Activities

Co-funded by the Horizon 2020
Framework Programme of the European Union

COORDINATION AND SUPPORT ACTIONS FOR NEW INFRASTRUCTURES

OPEN SESAME

E-RIHS
EUROPEAN RESEARCH INFRASTRUCTURE FOR HERITAGE SCIENCE

LEAPS member

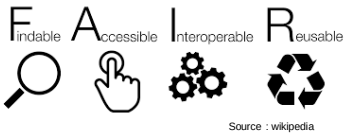
LEAPS

Data Management

Data Management: Global Approach

- Associating Users Representatives : ORGUES Association and two CNRS experts in scientific data management

- Updating the SOLEIL Data Policy :
  - ✓ *by encouraging Users and Scientists to produce FAIR data,*
  - ✓ *and facilitating this with data management services for storage and retrieval of experimental data and associated metadata collected and/or stored at SOLEIL.*



Source : wikipedia

- A survey to identify the « Data Reduction and Analysis Services » essential or desirable to provide

- Continuation / development of collaborative actions:
  - ✓ *LEAPS-IT, JRA2-CALIPSOplus, ISPyB, Orange, etc.*

- Upgrading Scientific Computing Resources:
  - ✓ *On Premise Resources supplemented by Community Resources and/or other External Resources paid for use or fee ➔ adaptation to changing needs (data production, …)*

Due to CNRS security instructions and French Policy for the Protection of Scientific and Technical Potential: prefer external resources operated by French firms

Data Management : Updating SOLEIL Data Policy

Based on PANDATA model and its applications by other facilities, reorganized and completed with the help of CNRS experts

- → Curation of raw data and associated metadata: up to 5 years (striving 10 years) starting with the end of the respective beamtime; read-only ; well-defined formats (preferably Nexus/HDF5) ; DOI
- → Access : will be available to registered & authorized persons via a searchable on-line catalog
- → Embargo : 3+1+1 years. For longer extensions, written requests submitted to SOLEIL validation
- → After the embargo period : raw data and metadata will be open access
- → CC-BY license for data held in long-term storage

Precisions:

- → Ownership: public research / proprietary research / specific agreements
- → Roles and responsibilities: Users, SOLEIL

Requests and recommendations to experimental team:

- → Establish a Data Management Plan, ensure completeness of metadata, …

Intention to provide means:

- → For the capture of metadata that are not automatically captured,
- → For reduction and/or processing of raw data

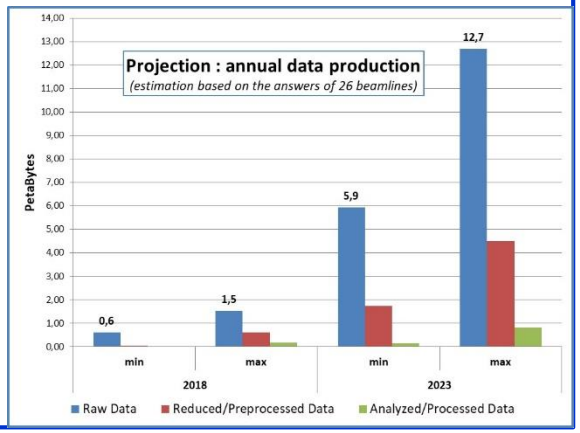
Precautions:

- → Long-term storage could be sub-contracted
- → In case of interruption / limitation / termination of services
- → SOLEIL not liable for the consequences of any interpretation of the data ; etc.

Data Management: Survey

It comes out from 26 beamlines (off 29) that:

- More than half of them using / foreseeing high throughput imaging techniques : 2D scanning / full field imaging, ptychography, tomography, electron microscopy…
- Strong need for on-line data reduction: to ensure data quality before continuing long acquisition processes and to provide users with reduced data ready to be analysed.
- Demands for more automation of on-line data reduction and analysis sequences
- On-site data analysis : more and more necessary
- Remote data analysis for reprocessing purposes: need expressed by half of BL Scientists on behalf of their Users
- Support requested by more than 80% of the BL scientists : programming skills, sw installation, application optimization, code parallelization, ...
- Towards very high data production: at least 6PB/year in 5 years
  - New Detectors
  - Flyscan acquisition technique
- Towards more and more remote access experiments, enabling a more efficient beamtime scheduling



Data Management: Next steps

➔ **Renew Data Infrastructure by taking into account the future HIGH data volume and throughput :**

- ❖ On-premise Data Infrastructure continuous upgrade: primary storage, network, on-line processing
- ❖ Off-site Scientific Computing Resources:
  - ✓ extension of our partnership with the CCRT (HPC centre) for off-line processing,
  - ✓ initiating explorations to facilitate data processing by the Users in the cloud
  - ✓ initiating a Pilot Project with the support of CNRS (and French Ministry of Higher Education and Research): in a first time for long-term data curation
- ❖ Data Transfer: initiating a feasibility study globus

➔ **Contribute to the completeness of metadata:** capture tool, …

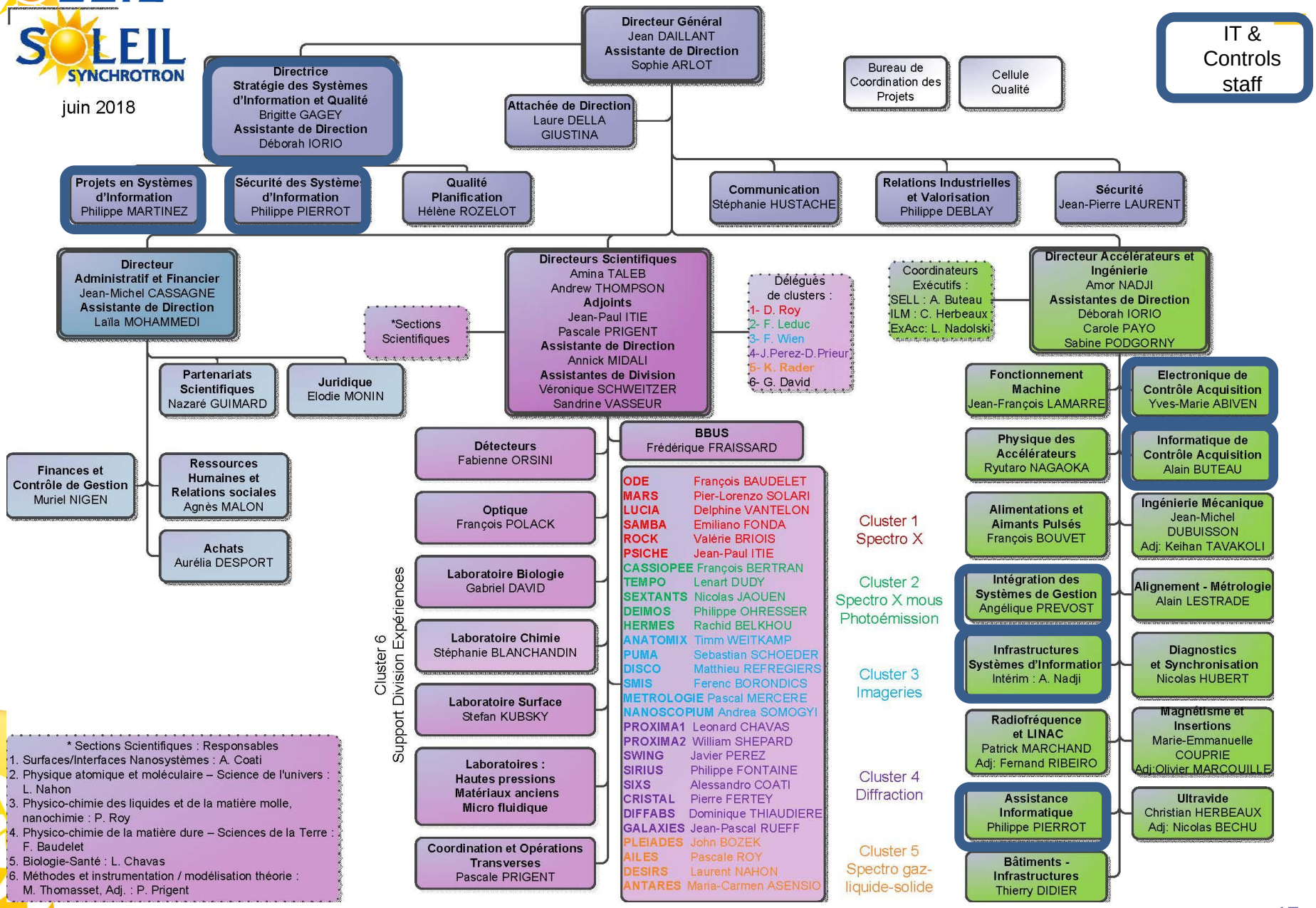
➔ **Ease Data Access and reuse:** on-line catalog, data embargo & long-term duration management, DOI and license attribution, …

➔ **Support Users:** a Data Management Plan template, …

➔ **Soon, a team dedicated to data analysis,**
relying on a commission of SOLEIL scientists representing the different experimental techniques and on collaborations/partnerships

Logistics Information

Logistics Information

- Badge and Wifi Access code: in your individual envelope
- Lunches at SOLEIL restaurant: tickets will be given before lunch
  Take a tray to the self; a room is reserved for us
- Dinner of August 22 at 7:00 pm at SOLEIL restaurant (same room);
  We will call taxis to go back to the Hotel d'Orsay or RER B station Le Guichet, after dinner.
- Dinner of August 23 at 8:00 pm at Le Gramophone Restaurant, 27 boulevard DUBREUIL, 91400 ORSAY, tel: +33 1 69 28 42 15
  11 minutes walk from the Hotel d'Orsay : a plan will be given.

Organization