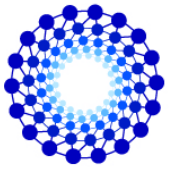


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# The PIGES association

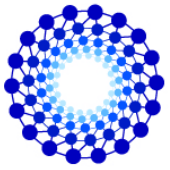
Jean-luc Lancelot – Sigmaphi  
CERN workshop – Superconducting  
technologies for next generation accelerators -  
December 5, 2012



# PIGES

Piges is an association created in 2010 gathering French companies involved in Large Scientific Instruments

- ❖ To promote their activities
- ❖ To enhance links with research labs (training...)
- ❖ To initiate common R and D programs

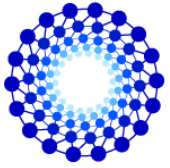


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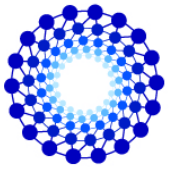
A lot of know how and skills

A capacity to undertake large R and D projects



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❖ Some examples of R and D for future accelerators

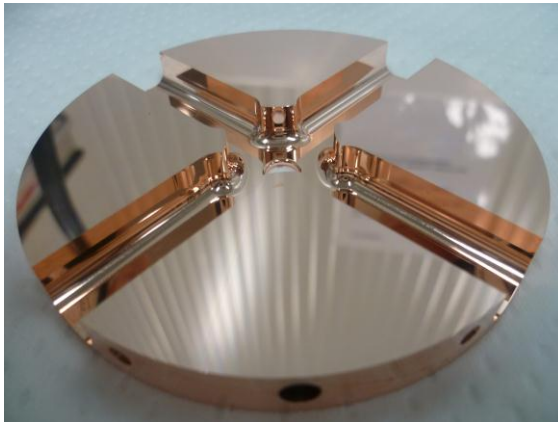


# PIGES

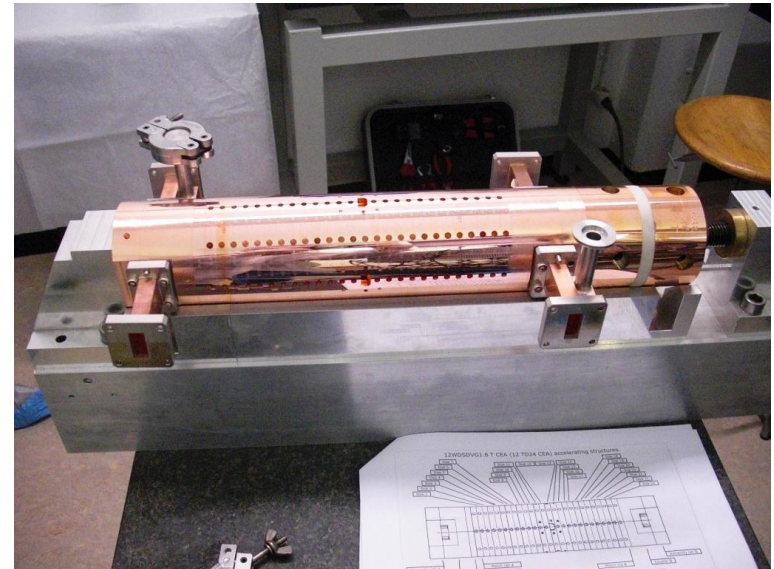


## ❖ Submicron machining

- CLIC cavities
- Couplers

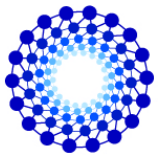


Disk Ø 65, Ra : 2 nm



Cavity

CNC Nano-Machining at common R&D center  
CEA / MKA – Vibraye (72)



PIGES

Bodycote

# RFQ brazing

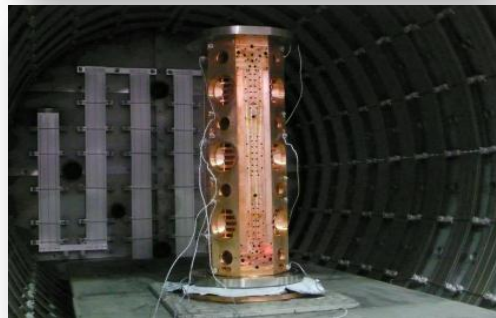
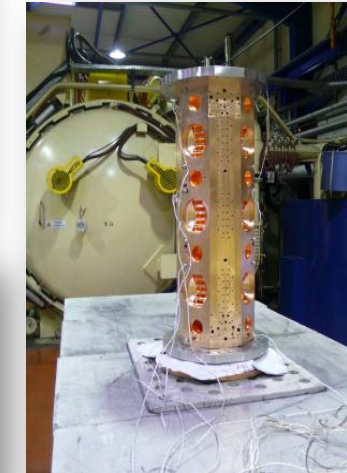
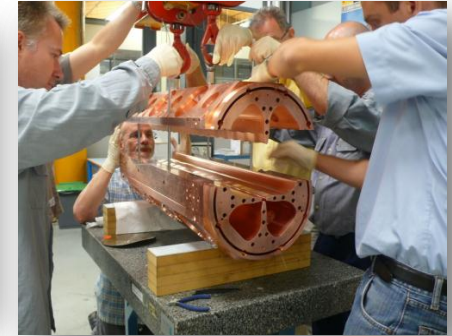
1. *Cleaning at CEA*

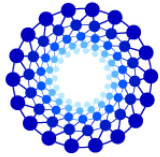
2. *Assembly at Mécachrome*

3. *Dimensional measurements at Mécachrome*

4. *RF measurements at Bodycote*

5. *Brazing at Bodycote*



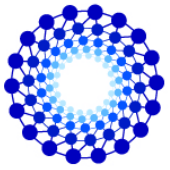


## Integration of 80 cryo modules X-FEL

- Integration in clean room ISO 4 at CEA Saclay
  - Cavities, couplers, valves, bellows, ...
  - Tests : cleanliness, airtightness, alignment, RF



- Cryo modules assembly outside of clean room
  - Cold mass, thermal shield, bellows, ...
  - Tests : RF, electrical, dimensional

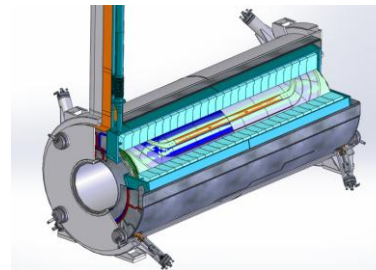


# PIGES

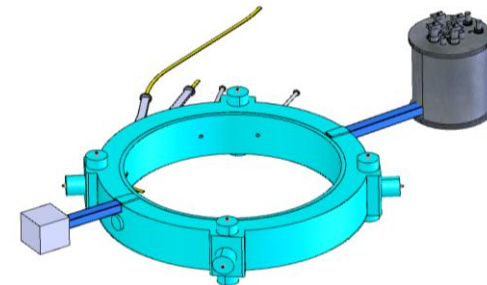


## ❖ SC magnets projects

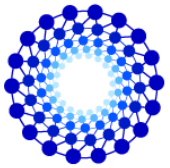
- From LHC corrector magnets MCBX
- To JLAB spectrometer (4,2 T, 4m long)



- And C400 cyclotron 400 MeV/u







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- ❖ Several programs running for SC magnet technologies development
  - MgB<sub>2</sub> magnet for IRM
  - MgB<sub>2</sub> cyclotron magnet
  - HTS magnets for CNRS
- ❖ A strong partnership with CEA/SACM (shared thesis...)
- ❖ Sigmaphi has R and D resources and facilities allocated to future accelerator magnets

- **Solid State Power Amplifiers and Transmitters**

- Worldwide first at FZD:

>1year R&D investment  
Close contact with  
the R&D group of NXP

2010

the first turnkey RF  
10kW SSPA in operation  
at the Research Center  
of Dresden (FZD)  
since January 2010

2012

10 turnkey 10kW SSPA in  
operation since roughly  
1 year at FZD

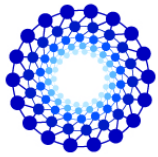


- **Solid State Power Amplifiers and Transmitters**

- High power
- Modular solution
- Upgradable
- High linearity
- High reliability
- High efficiency

40 to 1500MHz  
 100 to 150kW  
 CW and Pulse





# PIGES



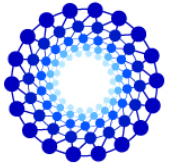
# AIR LIQUIDE

TM

## Helium liquefaction and refrigeration systems (1.8K – 80 K) :

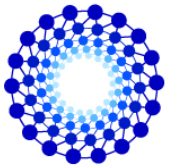
- Liquefiers : 20 l/h to 8 000 l/h
- Refrigerators : 100 W to 30 kW @4.5K
- Cryogenic storages
- Cryogenic transfert lines
- Gas driers and purifiers





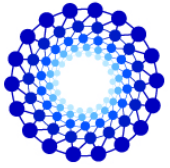
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❖ See also SDMS presentation this morning



# PIGES

- ❖ All these companies can link and work together to manage complex R and D projects
- ❖ Piges is also defining common actions with Société Française de Physique to develop recruitment and training
- ❖ Piges can help finding funds for common R and D between its members / CEA / CNRS



**PIGES**

**Thank you for your attention**