



## **Paco Sanchez, RF Group, CELLS** **(Consortium for the Exploitation of the Synchrotron Light Laboratory)**

# ALBA RF System

1. ALBA RF System Overview
2. Status of the Installation
  - a) RF Cavities
  - b) RF Transmitters
  - c) RF Waveguide Systems
  - d) Cooling Systems
  - e) Cabling
3. Digital Low Level RF (DLLRF, on behalf of A. Salom)
4. Next steps

### ALBA Schedule

Booster installation almost completed

LINAC re-commissioning October 2009

Booster commissioning from December 2009

SR installation to be completed by June 2010

(DAMPY cavities installation March 2010)

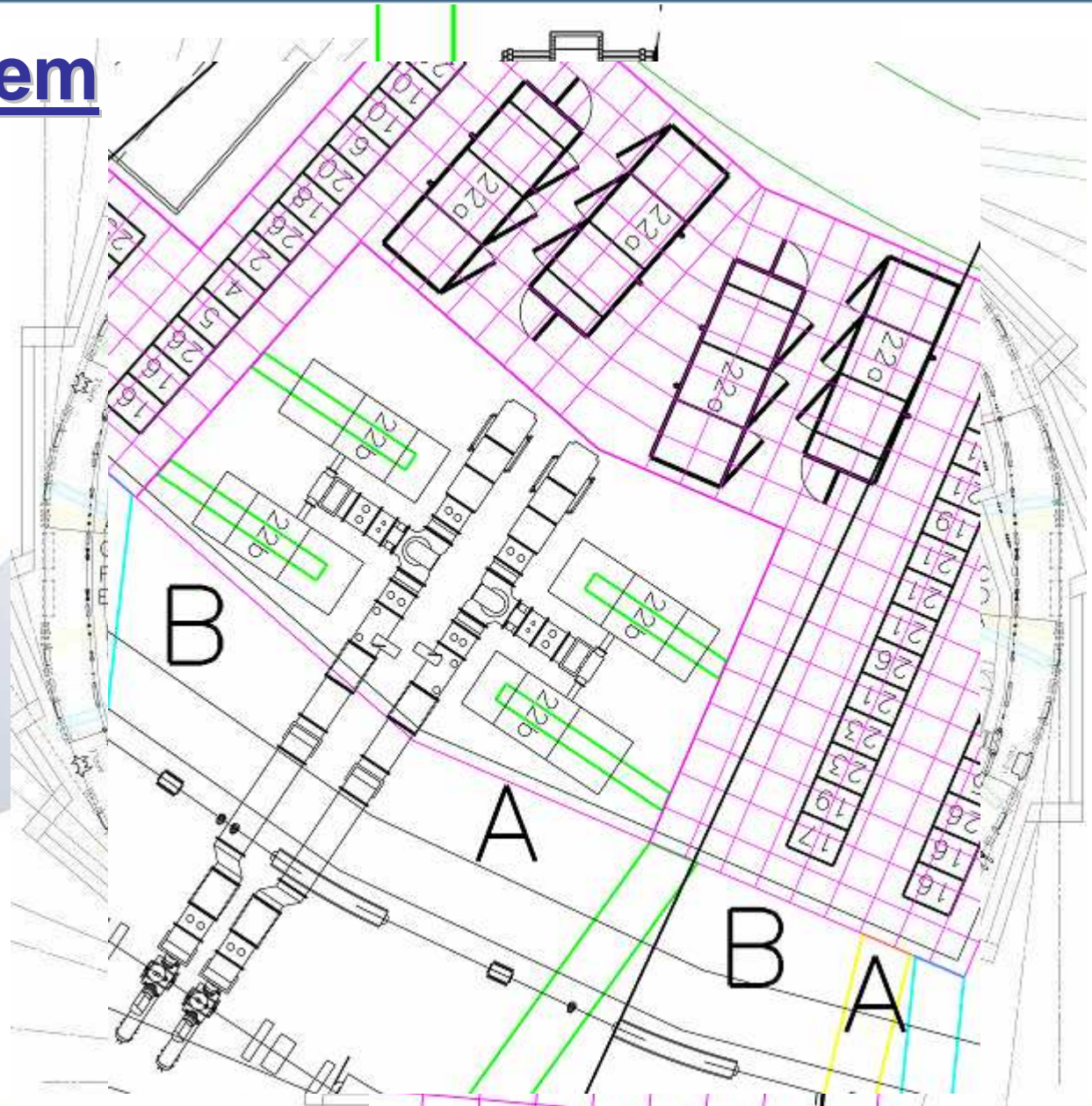
SR commissioning by July 2010

Beam for experts users by January 2011

## ALBA RF System Overview

Last year drawings:

- 1 RF plant in the Booster (80 kW)
- 6 RF Plants in the SR (6 x 150 kW)



## ALBA RF System Overview

Last week pictures:

- 1 RF plant in the Booster (80 kW)
- 6 RF Plants in the SR (6 x 150 kW)
- Booster Cavity
- DAMPY cavities (SR) still conditioning (see Francis talk)



## RF Booster Cavity

### Status:

- ✓ Cavity installed and aligned
  - ✓ Vacuum pumps working
  - ✓ Cabling and Sensors installed
  - ✓ Water cooling connected
- 
- ☐ Test water cooling flow, pressure and water leaks
  - ☐ Connect air cooling (RF window and WATRAX)
  - ☐ Check EPS and interlocks (whole RF Plant)
  - ☐ RF commissioning and cavity conditioning (Nov 2009, Booster)



## RF Transmitters

### Status:

- ✓ All cabinets installed (2 x 13)
- ✓ DC commissioned
- ✓ IOT chariots installed
- ✓ Coax lines installed

### still THOMSON responsibility:

- ❑ 8 faulty PSM modules (out of 780)
- ❑ 4 faulty Aux PS (2 x focus PS + 2 x grid PS):  
Intervention in all installed SORENSEN PS for replacing 2 resistors
- ❑ 2 faulty Arc Sensors + 1 faulty Controller Board
- ❑ Install all tubes into the chariots
- ❑ Perform final RF commissioning (October 2009)



# RF Waveguide Systems

Status:

- ✓ Booster RF plant completed (WR1800, Circ, Load)
- ✓ SR RF Plants only Service Area (CaCo + WR1800 + Circ + Load)



- ❑ SR RF Plants (Tunnel)  
after DAMPYs installation
- ❑ Circulator:  
Delayed by 1,5 years  
Control by VSWR



Pulsed conditioning (fast adaptation changes)

Also cw conditioning (change IOT load, i.e. IOT power ~ 5kW)

Manual control for cavity conditioning (to avoid vacuum trips)

# Water and Air Cooling Installation

## Status:

- ✓ Water collector for Booster RF Plant installed
- ✓ Pump + tank installed for preamp  $P_{\text{inlet}} = 2$  bar

$P_{\text{inlet}} = 9$  bar,  $P_{\text{outlet}} = 3$  bar

$P_{\text{tank}} > 1,3$  bar → Pump ON

$P_{\text{tank}} < 0,5$  bar → Pump OFF



- ❑ **Booster water cooling under tests**
- ❑ **Water collectors for SR, expected by February 2010**
- ❑ **Water collectors for DAMPYs, expected by March 2010**
- ❑ **Air cooling for WATRAX and CaCo → air amplifier vs. ventilator**
- ❑ **Air cooling for Cavities RF window (connection pending)**

## Cabling Installation

Status:

- ✓ Electrical power boards for each RF Plant
- ✓ Power cables completed
- ✓ Laying RF cables on Booster RF Plant



- ☐ **Booster: optical fibers for arc detection**
- ☐ **SR: RF cables**
- ☐ **Control cables (temp, flow meters)**
- ☐ **Personal Safety System interlocks**



## ALBA Digital LLRF System (Angela Salom)

Modules installed in the Booster RF plant:

- ✓ Analogue Front ends
- ✓ Amplitude and Phase Control Loop
- ✓ Tuning loop
- ✓ Timing system
- ✓ RF detectors
- ✓ Arc detectors
- ✓ Fast Interlock Modules (FIM)

❑ SR on progress, almost finished



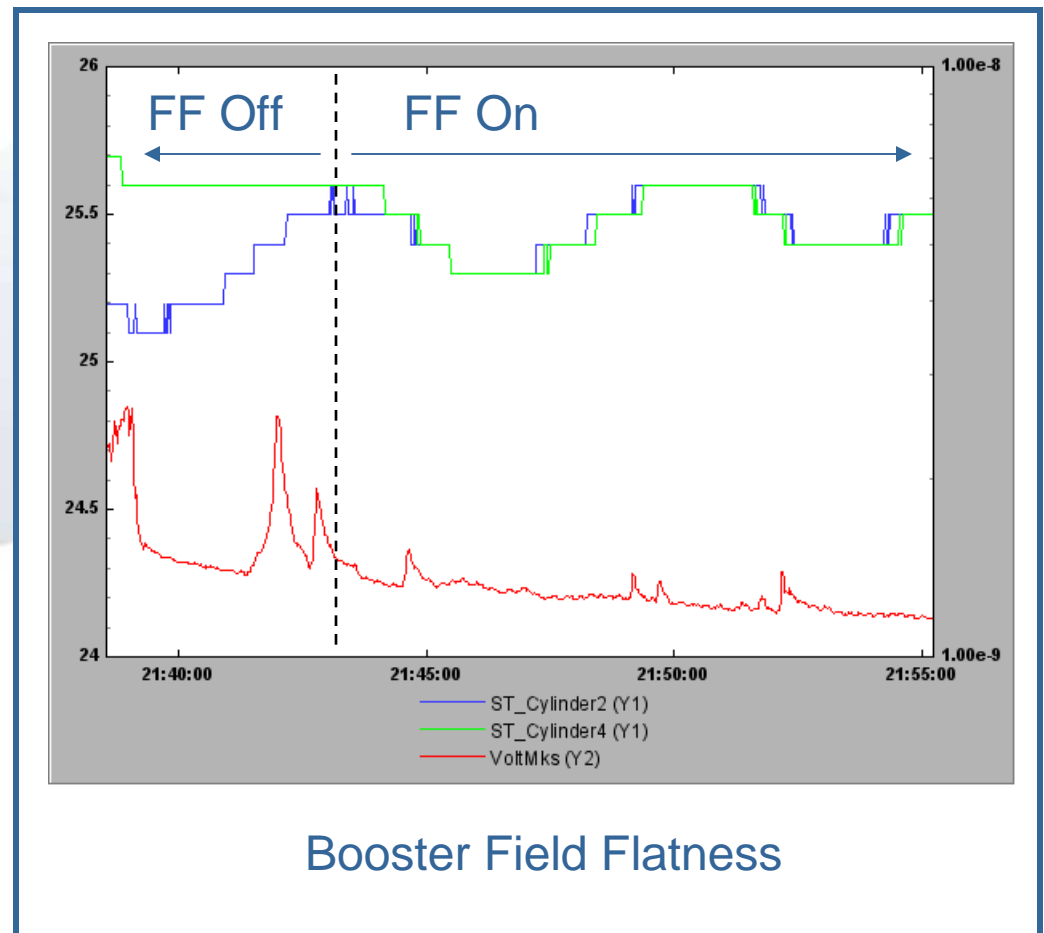
## DLLRF: Last Updates

(Angela Salom)

In addition to  $\Delta$ ,  $\varphi$  and Tuning Loop:

- ✓ Automatic Conditioning →  
16 hours to reach 70kW  
(Sept-2009, on DAMPY\_03)
- ✓ Fast Data Logger →  
400ms of data  
(32 diagnostic signals at 5MHz)
- ✓ Frequency Tuning ( $\pm 50$ kHz)
- ✓ Booster 5 Cells Cavity

Field Flatness



## Next steps

### BOOSTER:

**finished December 2009**

- Complete Cabling and Water / Air cooling installations
- IOT RF commissioning
- Booster cavity commissioning

### SR:

**finished by June 2010**

- DAMPY cavities conditioning and installation
- Cabling and Water / Air cooling installations
- IOT RF commissioning
- SR Dampy cavities commissioning

### **On behalf of the ALBA RF Team:**

*Angela Salom*

*Michel Langlois (now at ESRF)*

*Paco Sánchez*

*Francis Pérez*

*Support from*

*Eng. Div. Marc Cornelis (now at F4E)*

*Comp. Div. Roberto Ranz*

# **Thanks for your attention**



IOT Operating  
Hours