



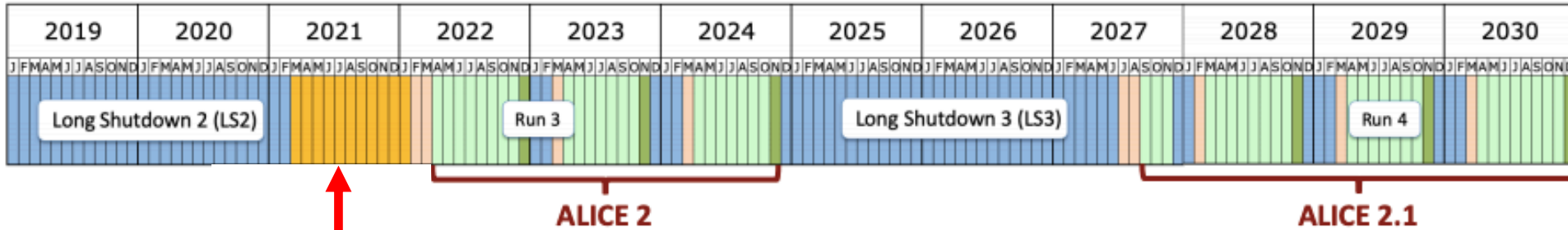
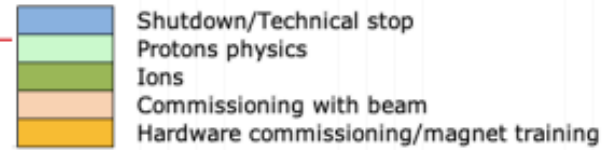
**ALICE**

# Report attività per Preventivi 2022

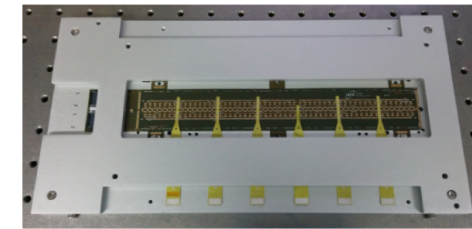
# ALICE Roadmap

A Large Ion Collider Experiment

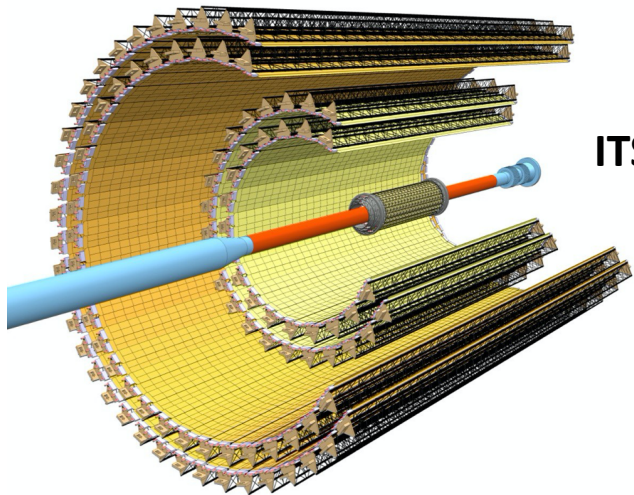
## The LHC roadmap for ALICE



**Today**



ITS OL HIC

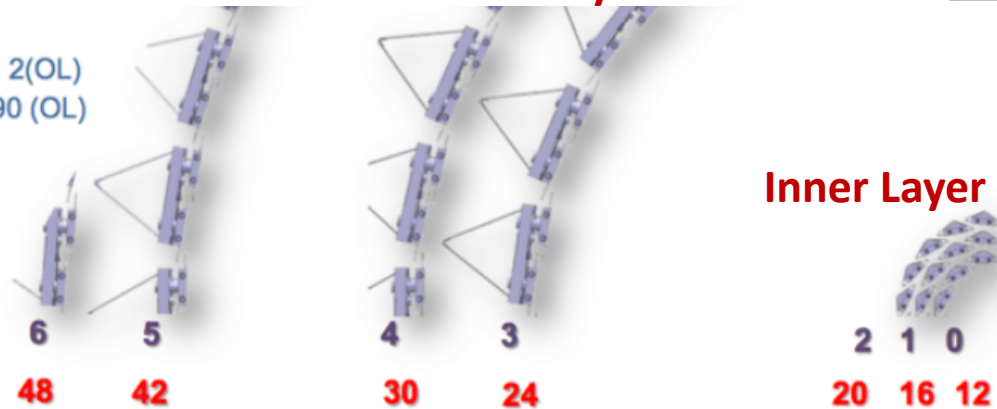


ITS

### Outer Layer

The ITS is constituted by  
 - 7 layers; 3 (IL), 2 (ML), 2 (OL)  
 - 192 staves; 48 (IL), 54 (ML), 90 (OL)

Layer #  
 n. of Staves

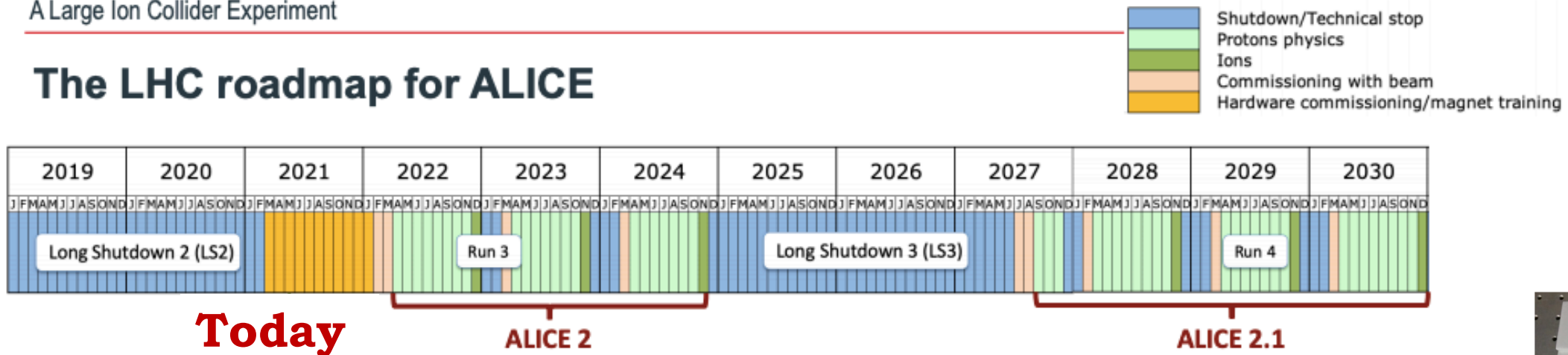


### Inner Layer

# ALICE Roadmap

A Large Ion Collider Experiment

## The LHC roadmap for ALICE

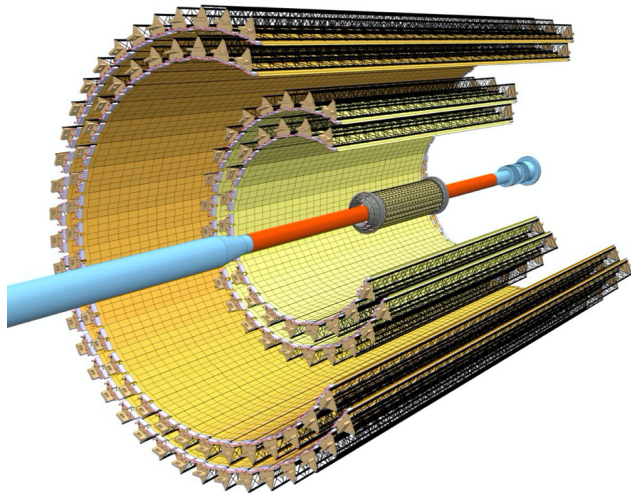


**Today**

**ALICE 2**

**ALICE 2.1**

**ITS 2**



ITS OL HIC

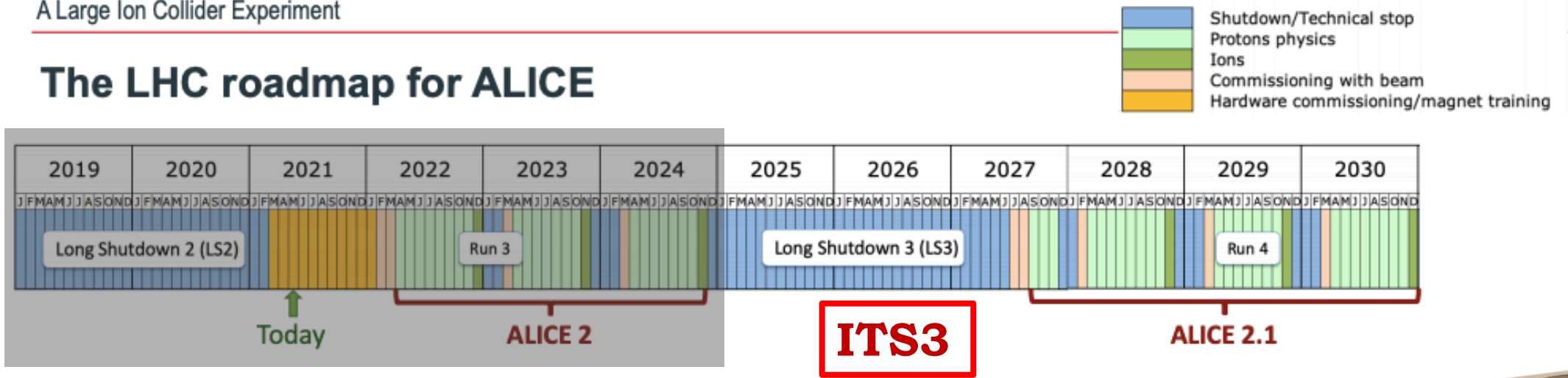
### Attività della Sezione di Bari:

- Prima dell'installazione ITS2 2021:
  - Contributo fondamentale per OL
    - [Produzione: 686 HIC montati-> Funzionanti 87%]
  - PL Vito Manzari fino al 2020
  - Attualmente In commissioning (->PhD fanno Offline shifts)
- LHC Interface, HMPID, Calcolo, Analisi dati su HF, LF

# ALICE Roadmap

A Large Ion Collider Experiment

## The LHC roadmap for ALICE

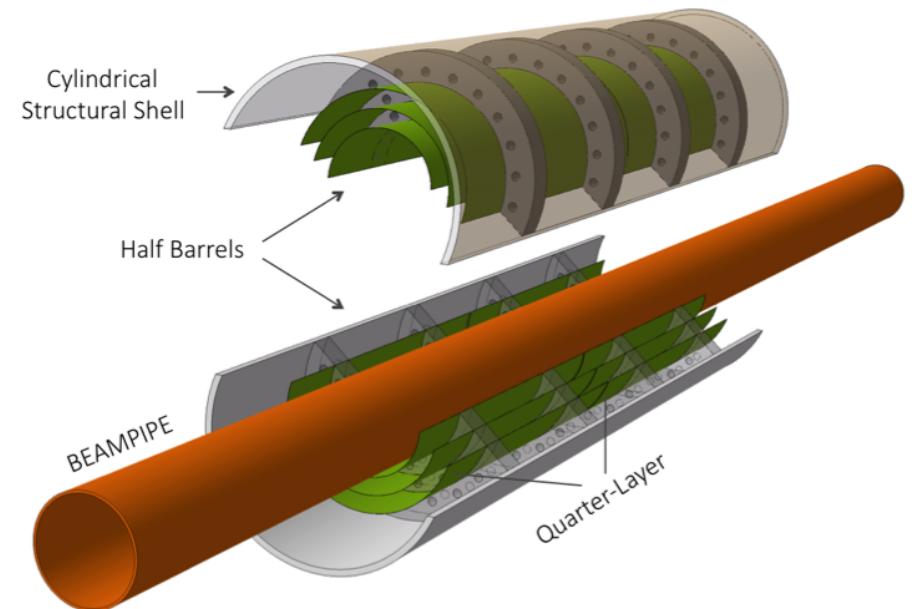


### ITS2 Inner Layer upgrade only ->ITS3

- Removal of water cooling
- Removal circuit board
- Removal mechanical support



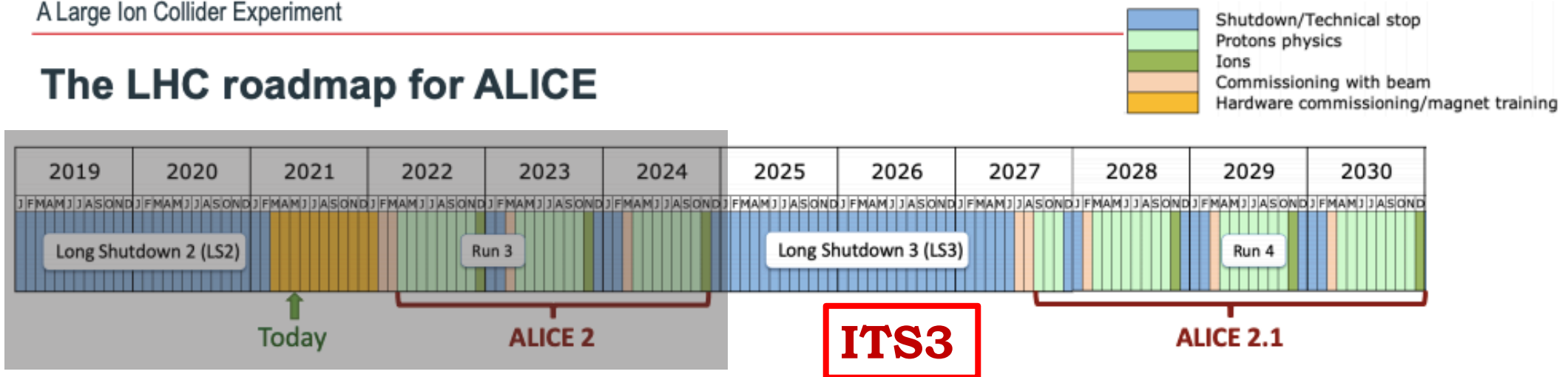
Sostituzione dei 3 layer nell' Inner Layer nel LS3 con 3 layer completamente cilindrici



# ALICE Roadmap

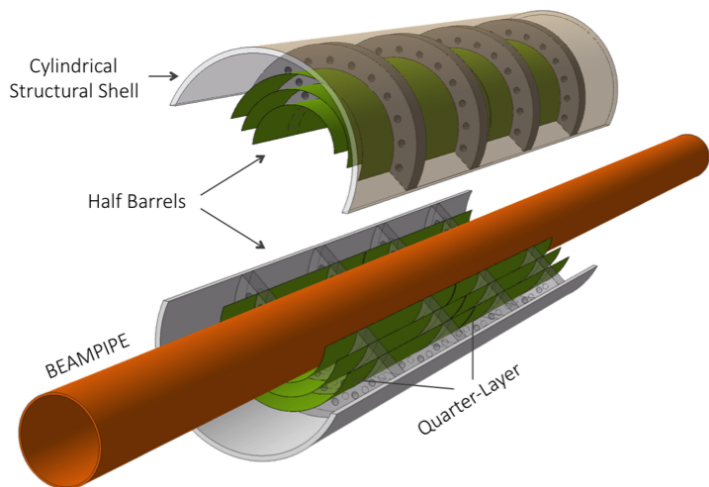
A Large Ion Collider Experiment

## The LHC roadmap for ALICE



### Attività R&D previste in Sezione a Bari:

- bendable FPC design
- wire-bonding interconnection (over bent surface) study
- super-ALPIDE (first example of large bent chip) setup assembly
  - bonding tool design
  - mechanical support design
- carbon foam (for mechanical support) thermal capacity study
- bent ALPIDE characterization

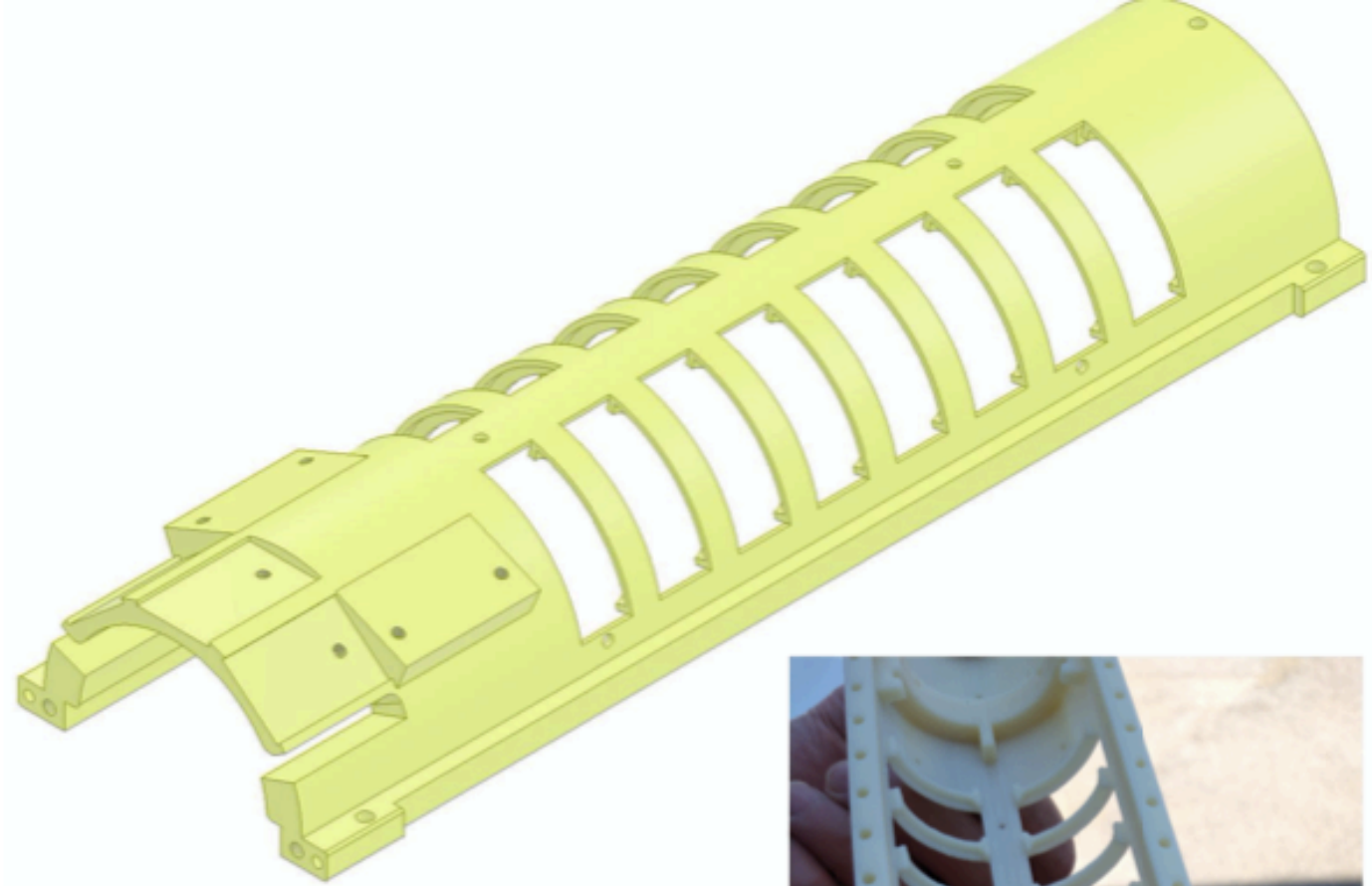
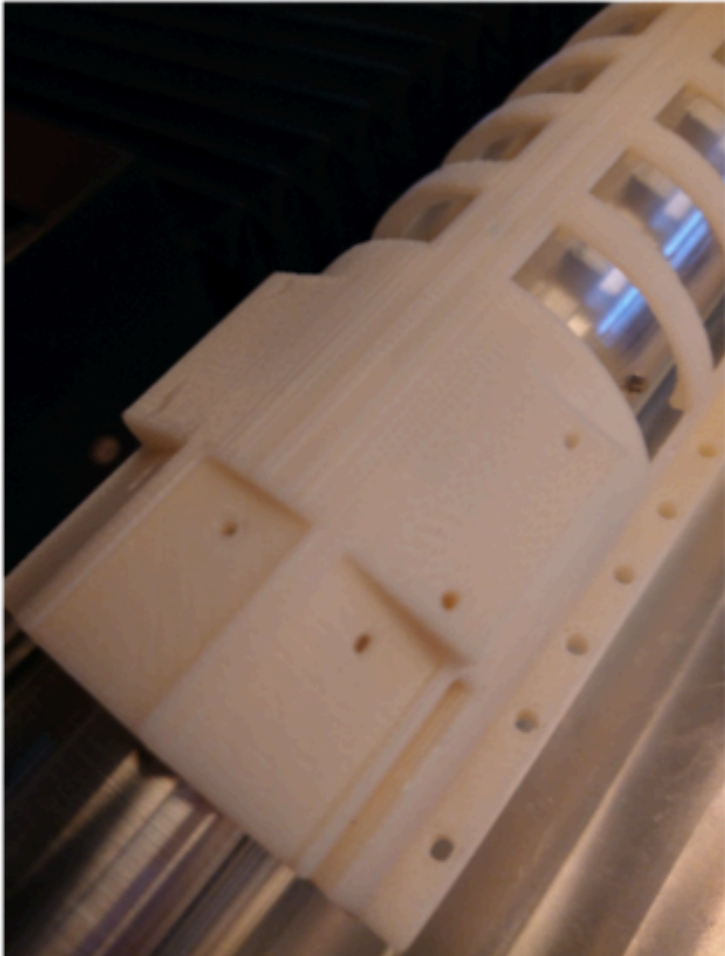




## Super-ALPIDE setup

### Exoskeleton

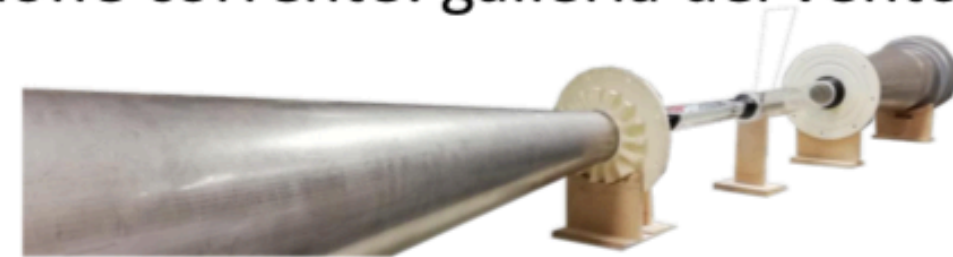
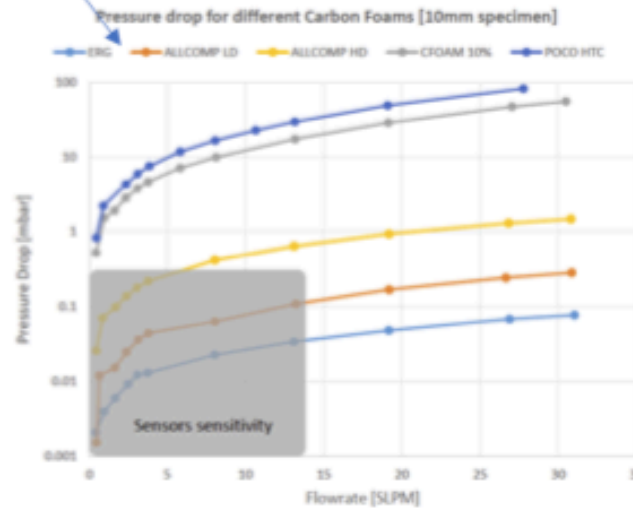
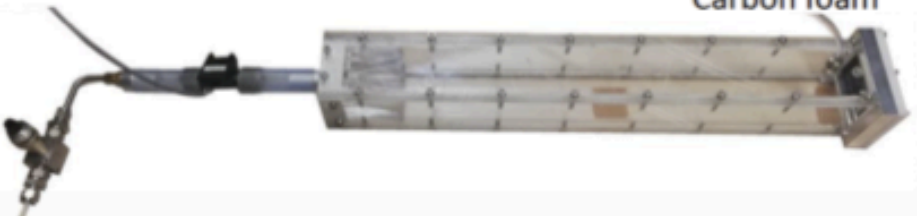
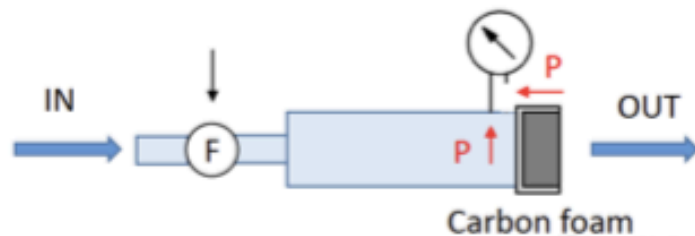
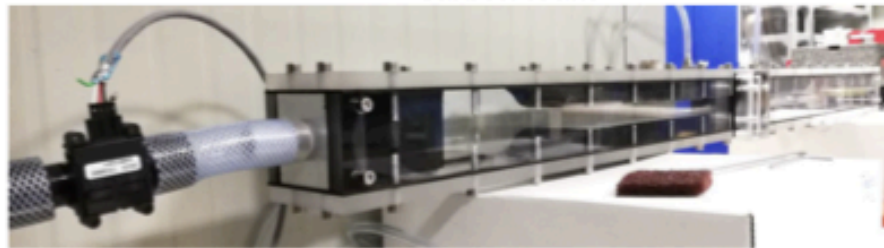
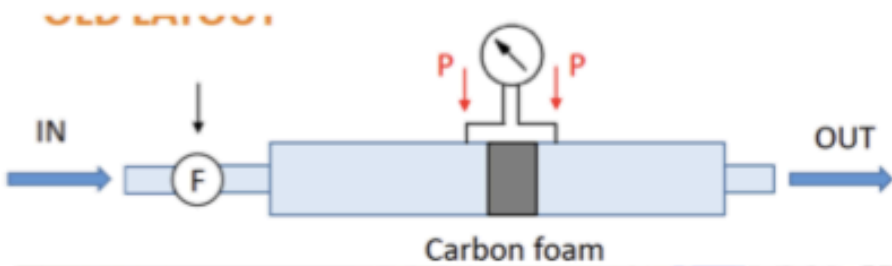
- First version designed by Magnus Mager
- Design finalization in Bari
  - edge-FPC integration
  - Bonding machine compatibility



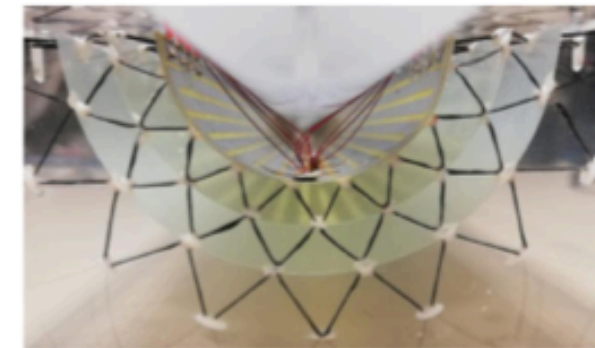
# Caratterizzazione proprietà Carbon Foam (CF)

- Pressure drop test
  - Diversi layout provati nel 2021
  - Misure su diversi tipi di CF

- Versione corrente: galleria del vento



L0 equipped with 3 PT1000 temperature sensors



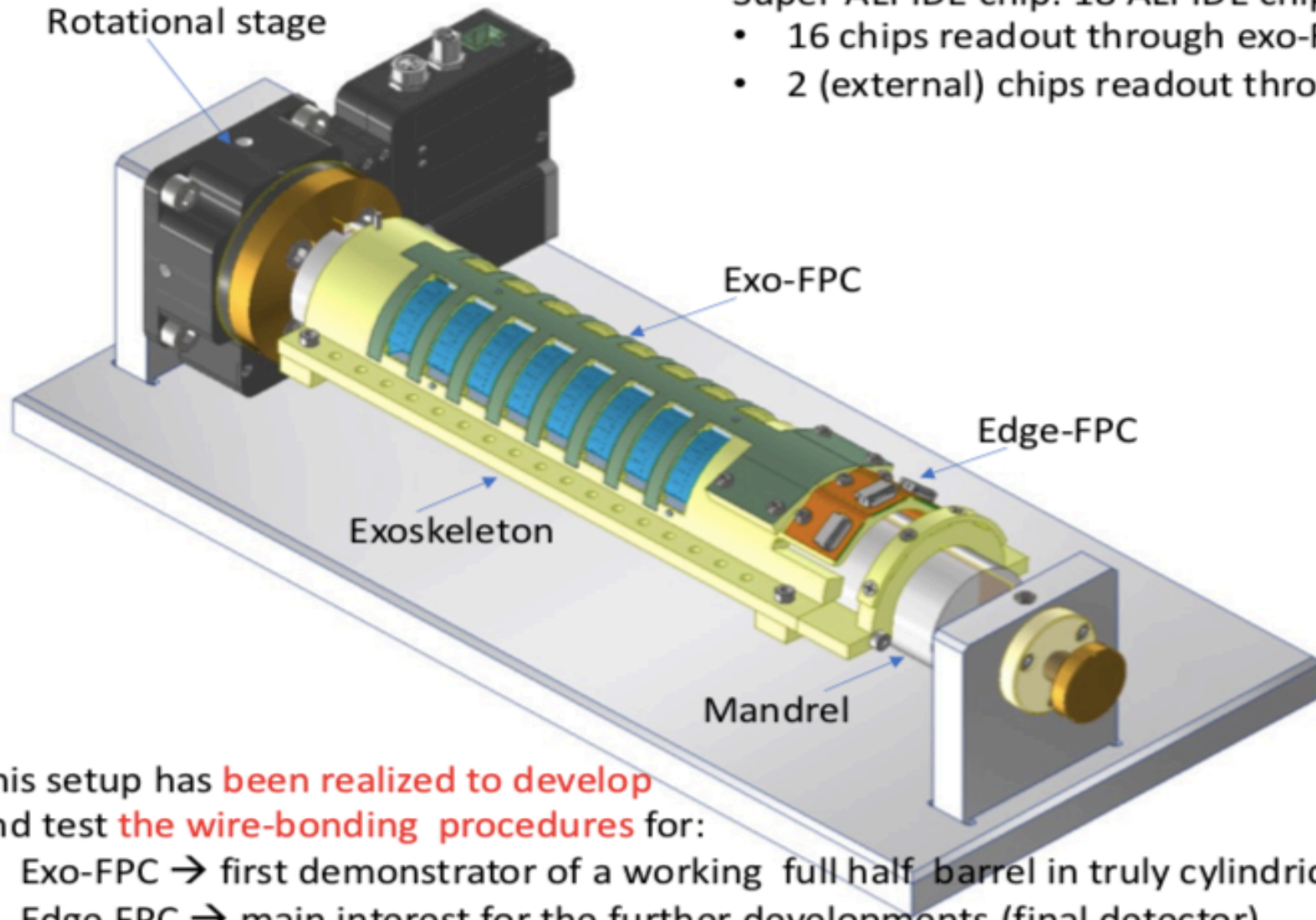
Studio del raffreddamento a valle del primo supporto (ring) in fibra di carbonio



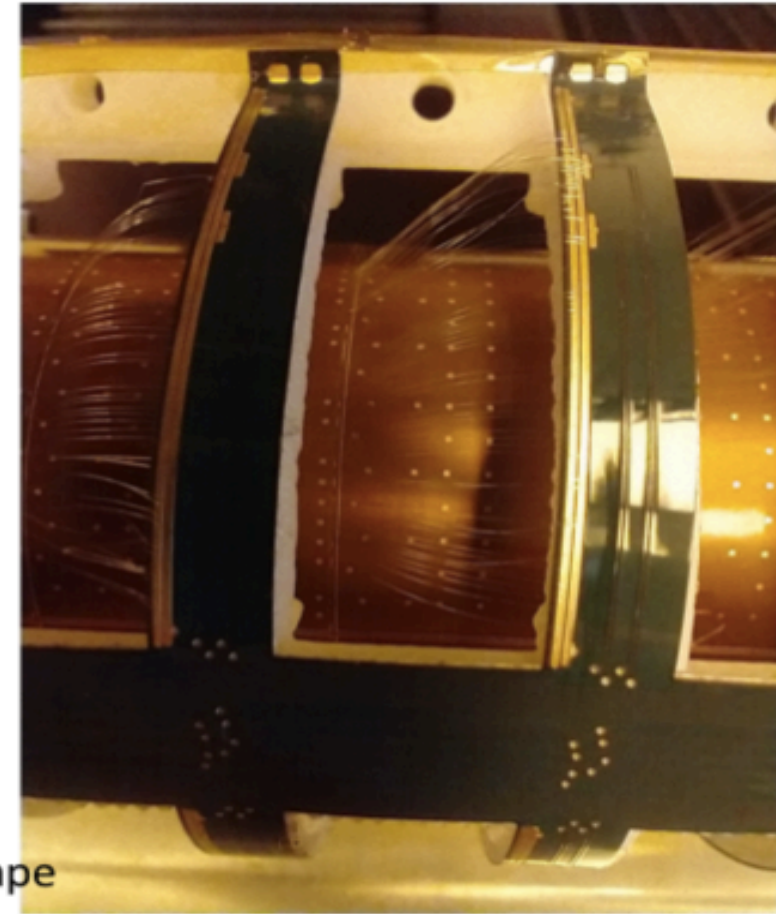
2022: attività di simulazione ed ottimizzazione



## Super-ALPIDE (mock-up) setup: development of the wire-bonding procedure and FPC design



- Super-ALPIDE chip: 18 ALPIDE chips over 2 rows in one big structure
- 16 chips readout through exo-FPC [bond over 7 mm pads vertical distance]
  - 2 (external) chips readout through edge-FPC [bond at the same quota]



This setup has **been realized to develop** and test **the wire-bonding procedures** for:

- Exo-FPC → first demonstrator of a working full half barrel in truly cylindrical shape
- Edge FPC → main interest for the further developments (final detector)

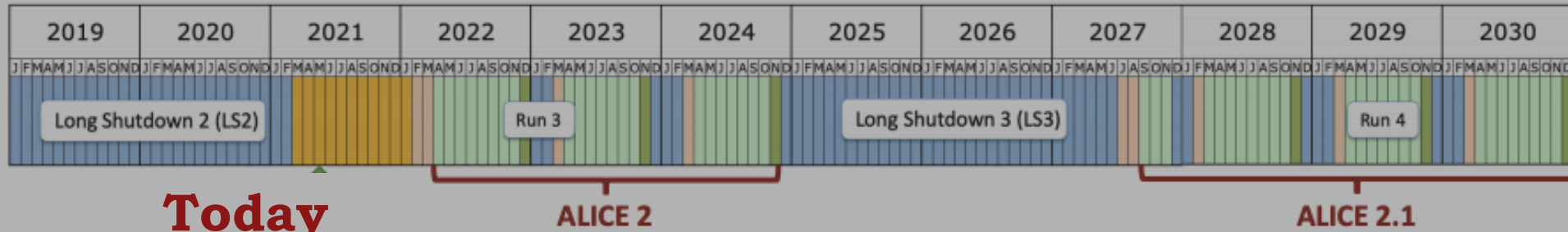
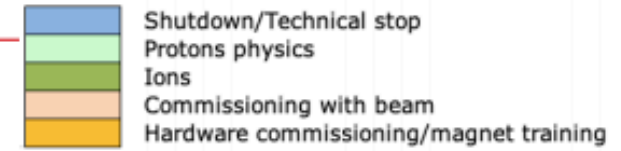
The present mandril holds a mock-up of the bended super-ALPIDE



# ALICE Roadmap

A Large Ion Collider Experiment

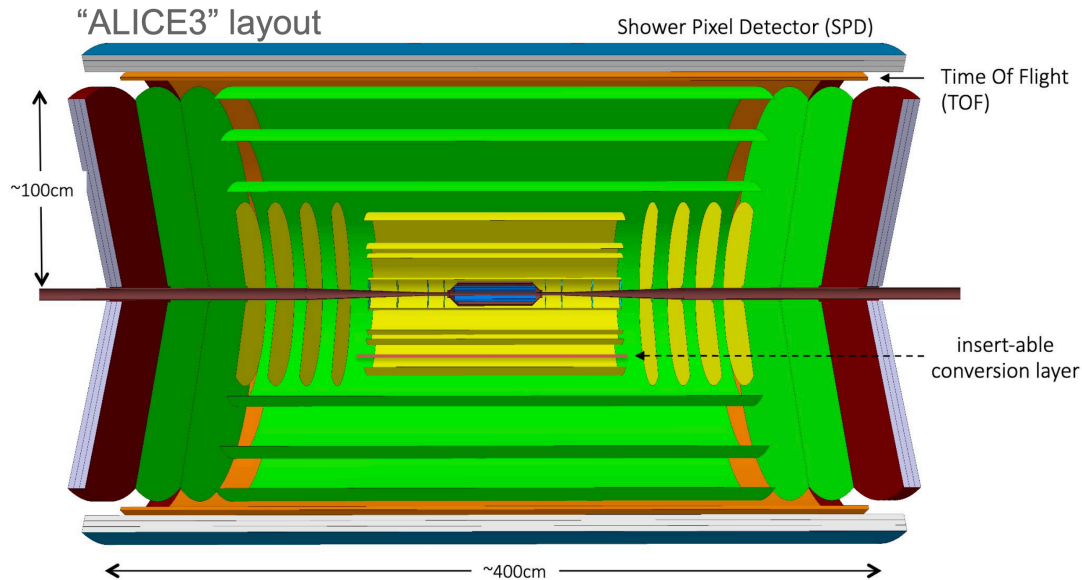
## The LHC roadmap for ALICE



Today

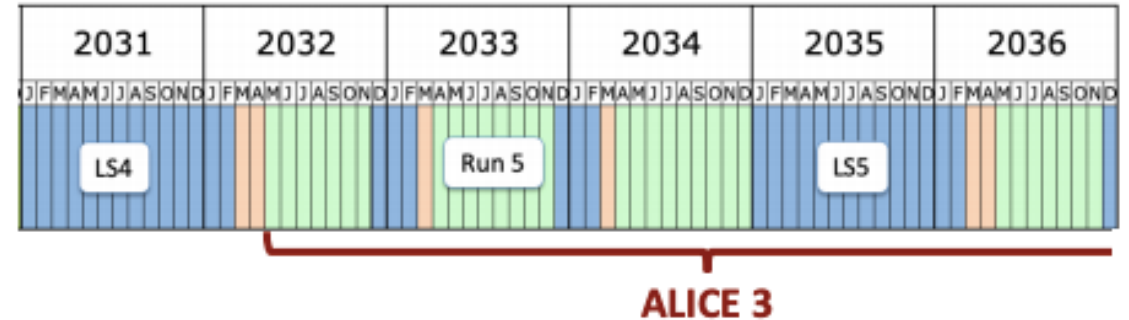
ALICE 2

ALICE 2.1



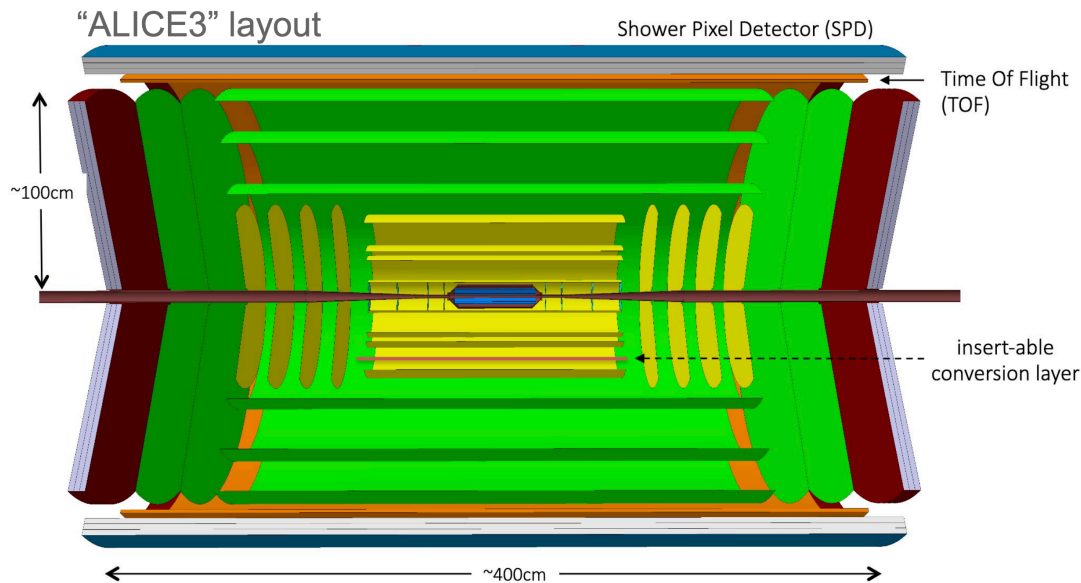
“Ambition to design a new experiment to continue with a rich heavy-ion programme at the HL-LHC”

Update of the European strategy for particle physics



ALICE 3

# ALICE Roadmap



## Tracker → ITS3

Almost massless silicon detector  
Spatial resolution

- Innermost 3 layers:  $\sigma < 3\mu\text{m}$
- Outer layers:  $\sigma \sim 5\mu\text{m}$

Vertex material thickness

- $X/X_0 \sim 0.05\%$  / layer

## PID:

TOF con LGAD

Possibile rivelatore

Cherenkov per PID

- Photon detection: SiPM
- Radiatore : Aereogel

## Attività previste in Sezione a Bari:

- Studio preliminare su LGAD sensors (Low Gain Avalanche Detector)
- PID: R&D di SiPM e readout e performance aereogel (test beam)

In sinergia con EIC\_NET

- ❑ Lavoro previsto è in continuità con le attività in corso da Marzo 2021. Nel 2022 si prevede lo stesso impegno e coinvolgimento dei servizi.
  
- ❑ Discussione della attività previste su ITS3 con:
  - Cosimo Pastore (officina meccanica) : Bending wafers
  - Maurizio Mongelli (progettazione meccanica) : supporto meccanico ITS3
  - Giuseppe De Robertis (elettronica) : design di altri 2/3 FPC
  - Gigi Fiore (Camera pulita): wire bonding di prototipi ITS3



# Anagrafica 2022

Ricercatori	%	Sigle Affini
Barile Francesco	70	
Bruno Giuseppe Eugenio	90	10% STRONG
Colamaria Fabio	90	10% STRONG
Colella Domenico	80	
De Cataldo Giacinto	70	10% su STRONG
Di Bari Domenico	80	
Elia Domenico	60	10% IBiSCo
Kumar Shyam	90	
Manzari Vito	90	10% su STRONG
Mastroserio Annalisa	80	
Nappi Eugenio	70	
Palasciano Antonio	100	PhD
Sadhu Samrangy	100	
Tassielli Gianfranco	70	10% RD_FC
Torres Ramos Arianna Grisel	100	PhD
Volpe Giacomo	70	

Tecnologi	%	Sigle Affini
De Robertis Giuseppe	30	
De Venuto Daniela	60	
Diacono Domenico	20	
Donvito Giacinto	10	10 CIR_ibisco
Fiorenza Gabriele	100	PhD
Licciulli Francesco	20	Da confermare
Loddo Flavio	20	
Monopoli Vito Giuseppe	60	Da verificare
Pastore Cosimo	40	
Torresi Marco	50	
Vino Gioacchino	30	

**16 Ricercatori**  
**11 Tecnologi**  
**17.3 FTE**