

# Welcome to LNF

**Matteo Giovannetti**

LNF - INFN

ECFA-ECR INFN  
September 30<sup>th</sup> 2024



Istituto Nazionale di Fisica Nucleare  
Laboratori Nazionali di Frascati



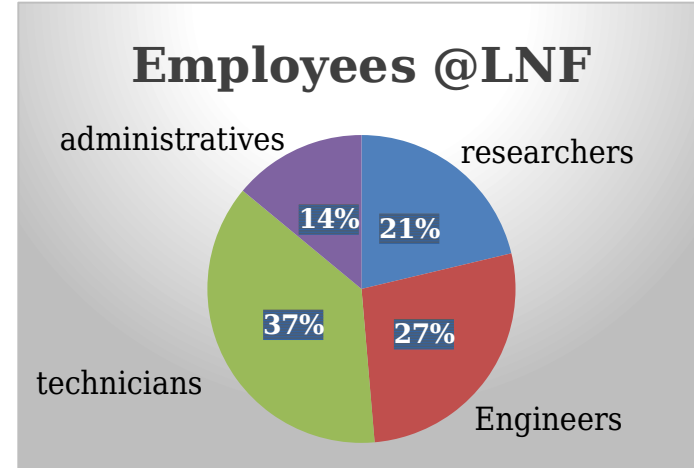
# The Frascati Laboratories

The Laboratori Nazionali di Frascati (LNF) extends on a area of about 140000 sqm, 20 km south-east of Rome, 2 km away from the town of Frascati



The area hosts the largest concentration of scientific institutions of the country, mainly in physics, astrophysics, space science

As of July 1, 2024 there are **330** permanent or fixed-term employees (researchers, engineers, technicians, administratives) and about **50** doctoral and postdoctoral students



The activity of the laboratory rests on four well defined pillars:

- Particle **Accelerators** Construction and Operation
- Particle **Detectors** Construction and Operation
- Fundamental and Applied **Physics Experiments**
- Public Engagement / Scientific **Dissemination**

# 70 years of accelerators at LNF

Since its foundation, the main mission of LNF has been the construction and operation of accelerators for nuclear and particle physics

**1957:** Official foundation of the Laboratori Nazionali di Frascati

**1959:** First accelerator built: the **Sincrotrone**

**1961:** First electron-positron collisions with **Ada**

**1969:** Start of operations of **ADONE**

**2000:** Start of operations of **DAFNE**

**2004:** Start of operations of **SPARC**

**2029:** Start of operations of **EuPRAXIA**

# Present accelerator facilities

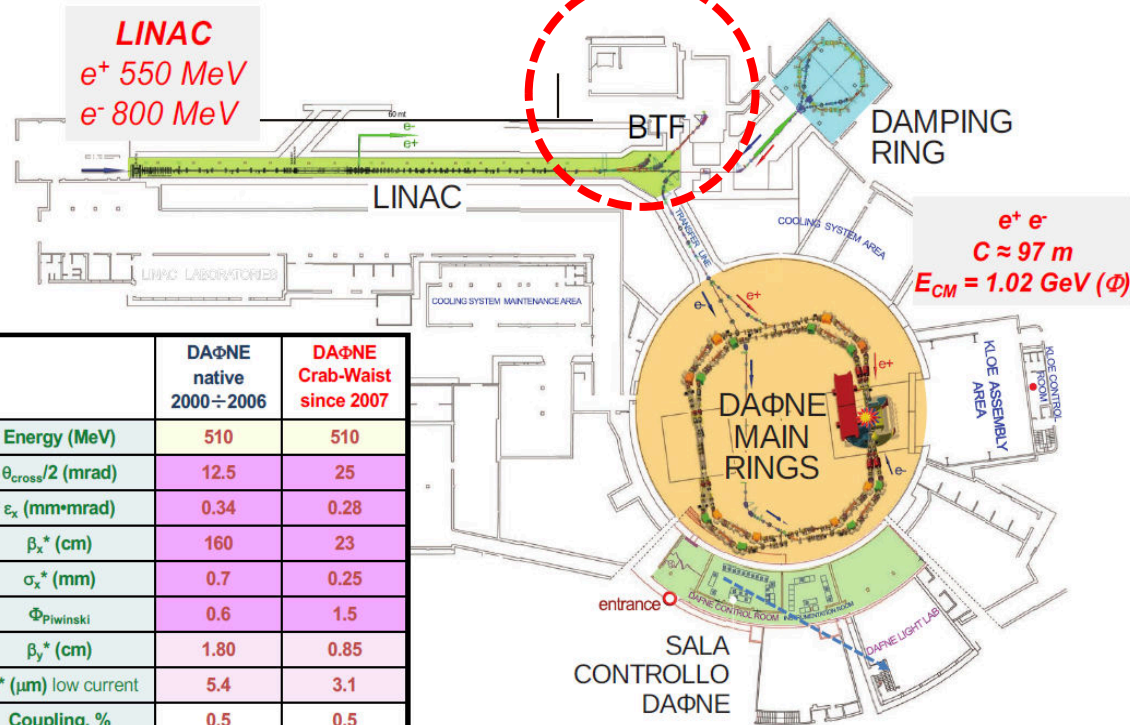
At present we are running two accelerator facilities:

- The DAFNE e+e- collider (1 GeV c.m.) with the annex Beam Test Facility (BTF)
- The SPARC\_LAB linear accelerator complex devoted mainly to PWFA studies

We do run also a series of laboratories dedicated to R&D of specific accelerator related technologies (magnets, RF, plasma, vacuum ecc...)

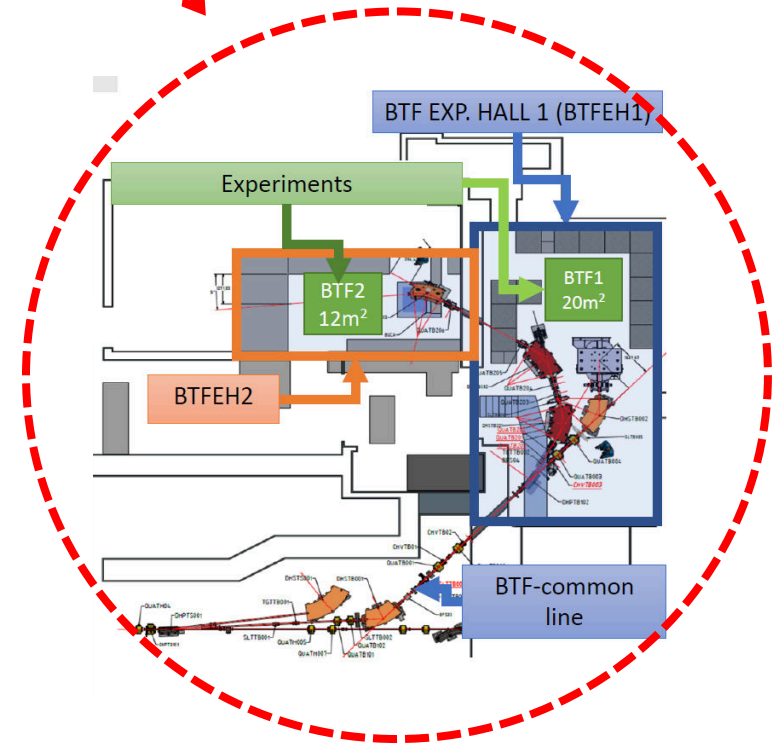


# The DAFNE complex



	DAΦNE native 2000 ÷ 2006	DAΦNE Crab-Waist since 2007
Energy (MeV)	510	510
$\theta_{cross}/2$ (mrad)	12.5	25
$\epsilon_x$ (mm·mrad)	0.34	0.28
$\beta_x^*$ (cm)	160	23
$\sigma_x^*$ (mm)	0.7	0.25
$\Phi_{piwinski}$	0.6	1.5
$\beta_y^*$ (cm)	1.80	0.85
$\sigma_y^*$ ( $\mu\text{m}$ ) low current	5.4	3.1
Coupling, %	0.5	0.5
Bunch spacing (ns)	2.7	2.7
$I_{bunch}$ (mA)	13	13
$\sigma_z$ (mm)	25	15
$N_h$	120	120

DAΦNE implemented and tested successfully a new approach to beam-beam interaction: the **Crab-Waist collision scheme**.



Pulsed  $e^+/e^-$  beams (50 Hz)  
 From 1010 to 1 p/pulse  
 Continuous energy 200-500 MeV

# Practical info

The **secondary gate**, located near the Tor Vergata train station, **will be open** at the following times:

MON: 1:00 PM – 3:00 PM  
MON: 6:00 PM – 7:30 PM  
TUE: 8:00 AM – 10:00 AM  
TUE: 1:00 PM – 3:00 PM

Coffee Breaks and Poster session will be held in front of the **Bruno Touschek Auditorium**

“For any need, please refer to the secretarial team, that will be always available to help”

14:00	<b>Welcome + Logistics</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Matteo Giovannetti</i> 14:00 - 14:15
	<b>ECR presentation &amp; summary previous INFN ECR event</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Nicolo' Jacazio</i> 14:15 - 14:30
	<b>ECR+ESPP</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Cecilia Borca</i> 14:30 - 14:45
15:00	<b>Current physics landscape: motivations and future collider projects</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Pierluigi Campana</i> 14:45 - 15:30
	<b>Accelerator technology for next generation colliders: challenges and opportunities</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Prof. Lucio Rossi</i> 15:30 - 16:00
16:00	<b>Break and group picture</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	16:00 - 16:15
	<b>Detector Tech. Challenges</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Gabriella Gaudio</i> 16:15 - 16:45
	<b>A theory perspective on future colliders: is it worth it or not?</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Roberto Franceschini</i> 16:45 - 17:15
17:00	<b>Review CSN2</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Giovanni Mazzitelli</i> 17:15 - 17:45
	<b>Review CSN3</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Rosario Nania</i> 17:45 - 18:15
18:00		
19:00	<b>Poster session: presentation</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	18:30 - 19:30

09:00	<b>INFN &amp; European Strategy</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	09:30 - 10:00
10:00	<b>INFN careers</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	10:00 - 10:30
	<b>CSN5 - Grant Giovani</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Cristina Vaccarezza</i> 10:30 - 10:45
	<b>Break, poster prize</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	10:45 - 11:00
11:00	<b>Discussion: open session</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	11:00 - 13:00
12:00		
13:00		

# Practical info

The **secondary gate**, located near the Tor Vergata train station, **will be open** at the following times:

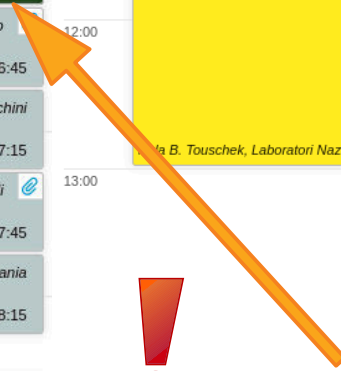
MON: 1:00 PM – 3:00 PM  
MON: 6:00 PM – 7:30 PM  
TUE: 8:00 AM – 10:00 AM  
TUE: 1:00 PM – 3:00 PM

Coffee Breaks and Poster session will be held in front of the **Bruno Touschek Auditorium**

“For any need, please refer to the secretarial team, that will be always available to help”

14:00	<b>Welcome + Logistics</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Matteo Giovannetti</i> 14:00 - 14:15
	<b>ECR presentation &amp; summary previous INFN ECR event</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Nicolo' Jacazio</i> 14:15 - 14:30
	<b>ECR+ESPP</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Cecilia Borca</i> 14:30 - 14:45
15:00	<b>Current physics landscape: motivations and future collider projects</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Pierluigi Campana</i> 14:45 - 15:30
	<b>Accelerator technology for next generation colliders: challenges and opportunities</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Prof. Lucio Rossi</i> 15:30 - 16:00
16:00	<b>Break and group picture</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	16:00 - 16:15
	<b>Detector Tech. Challenges</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Gabriella Gaudio</i> 16:15 - 16:45
	<b>A theory perspective on future colliders: is it worth it or not?</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Roberto Franceschini</i> 16:45 - 17:15
17:00	<b>Review CSN2</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Giovanni Mazzitelli</i> 17:15 - 17:45
	<b>Review CSN3</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Rosario Nania</i> 17:45 - 18:15
18:00		
19:00	<b>Poster session: presentation</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	18:30 - 19:30

09:00	<b>INFN &amp; European Strategy</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	09:30 - 10:00
10:00	<b>INFN careers</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	10:00 - 10:30
	<b>CSN5 - Grant Giovani</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	<i>Cristina Vaccarezza</i> 10:30 - 10:45
	<b>Break, poster prize</b> <i>Aula B. Touschek, Laboratori Nazionali di Frascati (Rome), Italy</i>	10:45 - 11:00
11:00	<b>Discussion: open session</b>	
12:00		
13:00		



**GROUP PICTURE BEFORE THE COFFEE BREAK**