



The Italian Summer Students Program at Fermilab

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EIC Meeting 2024

Bologna, June 28, 2024

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In partnership with:



UNIVERSITÀ DI PISA



This work was supported by the European Union's Horizon 2020 research and innovation program under the Marie Skłodowska-Curie Grant Agreement no 734303, 822185, 858199, 101003460, 101081478

And by the Fermi National Accelerator Laboratory, managed and operated by Fermi Research Alliance, LLC under Contract No. DE-AC02-07CH11359 with the U.S. Department of Energy

Outline

FERMI NATIONAL ACCELERATOR LABORATORY

- Italy @Fermilab (since early 80's)

THE ITALIAN SUMMER STUDENTS PROGRAM AT FERMILAB

- Students' Recruitment
- Training Programs
- Costs, Sponsorships, Students' Benefits
- Statistics (1983–2024)
 - 2020 and 2021 Programs (sadly) cancelled
 - 2022 Back To Work (21 Summer Students at Fermilab)
 - 2023 Progressing at full steam (27 Summer Students at Fermilab)
 - 2024 Progressing well (13 Summer Students at Fermilab)
- Internships at US Space Science Labs

CONCLUSIONS

Italy @Fermilab, some history

COLLIDER DETECTOR AT FERMILAB (CDF), SINCE EARLY 80's

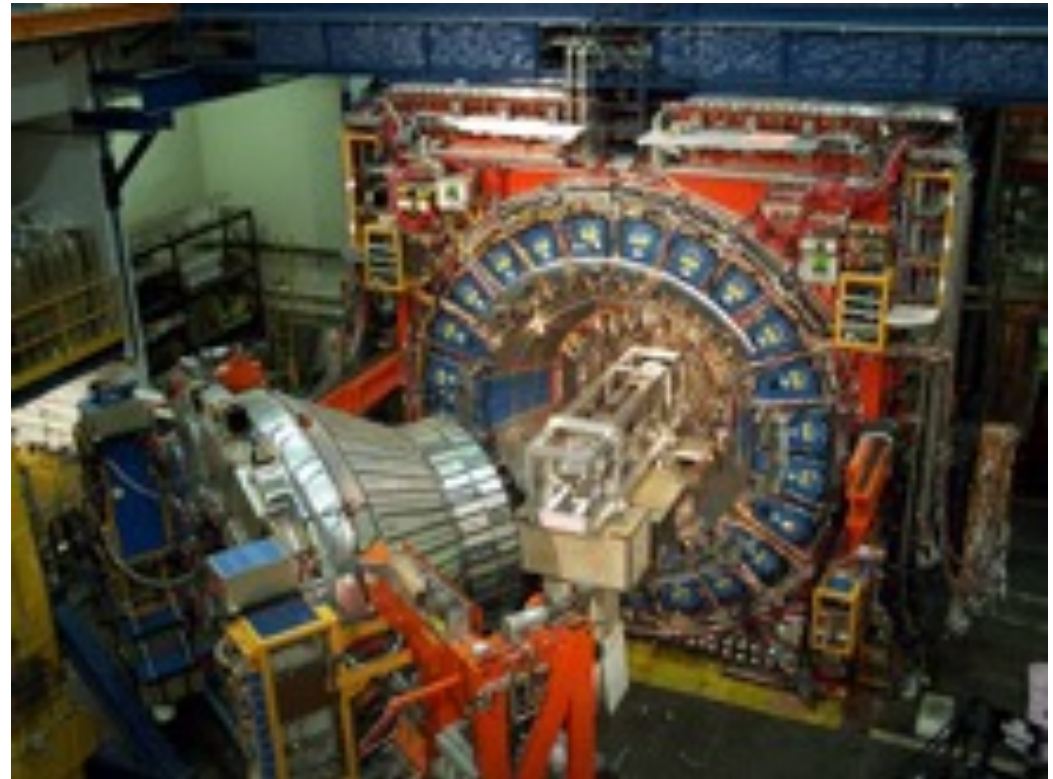
- ~100/600 Italian scientists in the years 2000-2010

BOLOGNA, FRASCATI, PADOVA, PAVIA, PISA, ROMA, SIENA, TRENTO, TRIESTE, UDINE (INFN DEPARTMENTS and UNIVERSITIES)

- 5 Co-Spokesperson from Pisa

~100 MASTER + 35 PhD THESES

The 2019 HEP prize of the EPS was awarded to the CDF and D0 Collaborations for the discovery of the top quark (1995)

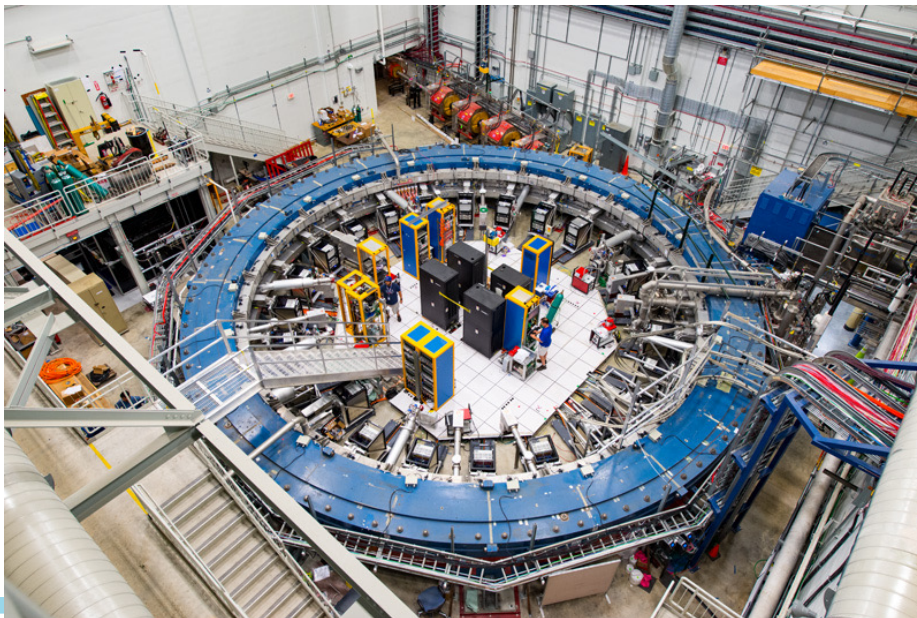


Italy @Fermilab, as of today

NEW LAB'S ENDEAVOURS

- **Muon (g-2)**: Measurement of the anomalous muon magnetic moment
- **Mu2e**: Muon to electron conversion experiment
- **Icarus, SBN, DUNE**: Short/Long-baseline neutrino experiments
- ~150 Italian scientists (Muon g-2, Mu2e, Icarus, DUNE Co-Spokesperson)

BOLOGNA, CATANIA, FERRARA, FRASCATI, GENOVA, GRAN SASSO, LECCE, MILANO, NAPOLI, PAVIA, PADOVA, PISA, ROMA, TRIESTE, UDINE (INFN DEPARTMENTS and UNIVERSITIES)



Students' Recruitment

INTERNATIONAL PROGRAM

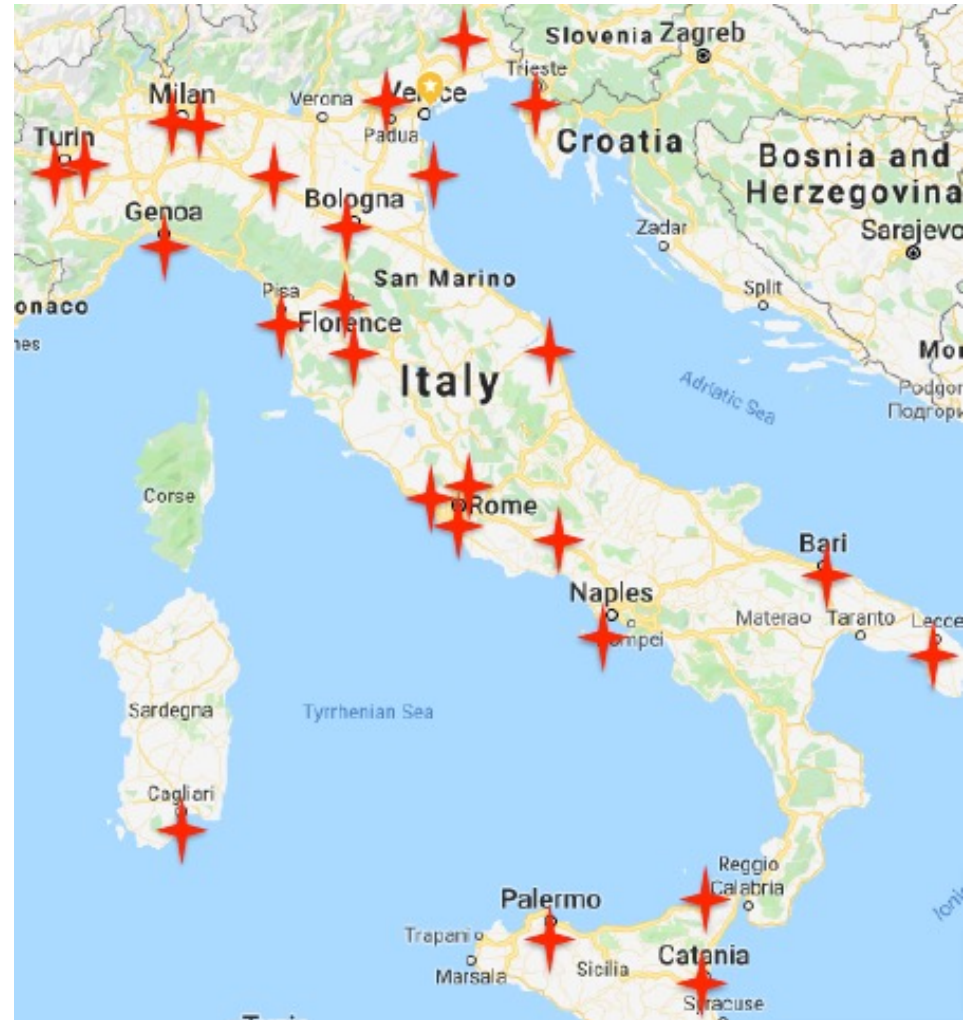
- Applications from most Italian and some European Universities

MASTER STUDENTS

- Physics/Applied Physics
- Engineering, Materials Science
- Computer Science

ADMISSION

- Curriculum Vitae
- Recommendation Letters
- Motivation Letter
- Interview
- Good knowledge of English



Training Programs

AUGUST – SEPTEMBER (9 WEEKS)

PROGRAMS FOR PHYSICISTS

- Design, construction, commissioning of particle detectors/accelerators
- Simulation of particle detectors/accelerators and particle physics experiments
- Analysis of data collected by particle physics experiments

PROGRAMS FOR ENGINEERS

- Design/Test of particle detectors/accelerator components
- Design/Test of superconducting materials and magnets for particle accelerators
- Development of fast electronics components/high precision mechanics
- Development of advanced computing infrastructures

UNIVERSITY CREDITS (acknowledged by the UNIFI Summer School)

- 6 ECTS credits (ECTS, European Credit Transfer and Accumulation System)

Applicants Benefits

WHAT FERMILAB PROVIDES

- Weekly stipend
- Free housing in Fermilab Dorms
- Free shared rental car
- Total cost ~17000 \$/student

WHAT FERMILAB DOES NOT PROVIDE

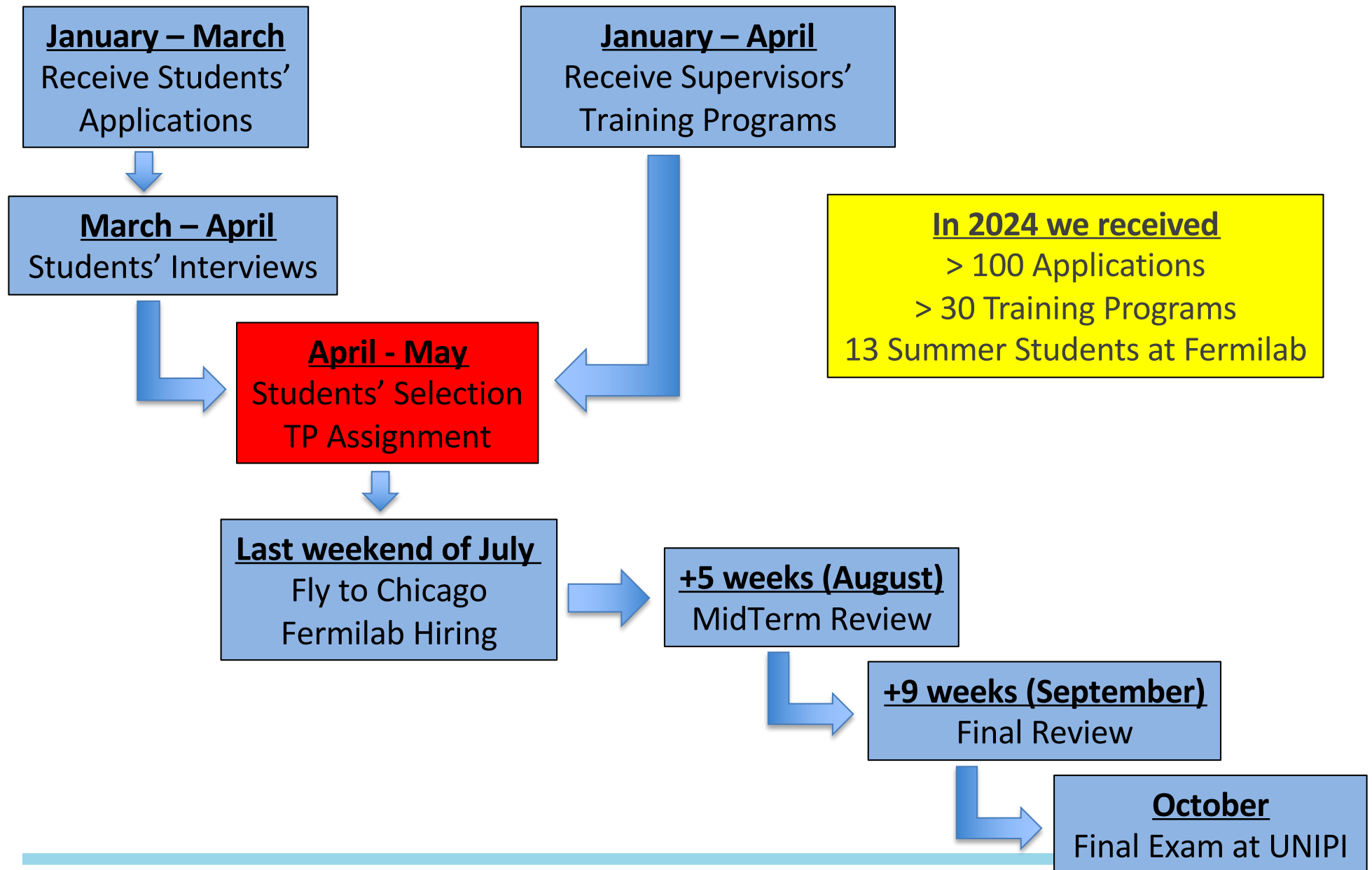
- Round-trip journey from Italy to Chicago
- Health insurance: mandatory

STUDENTS' TO-DO LIST

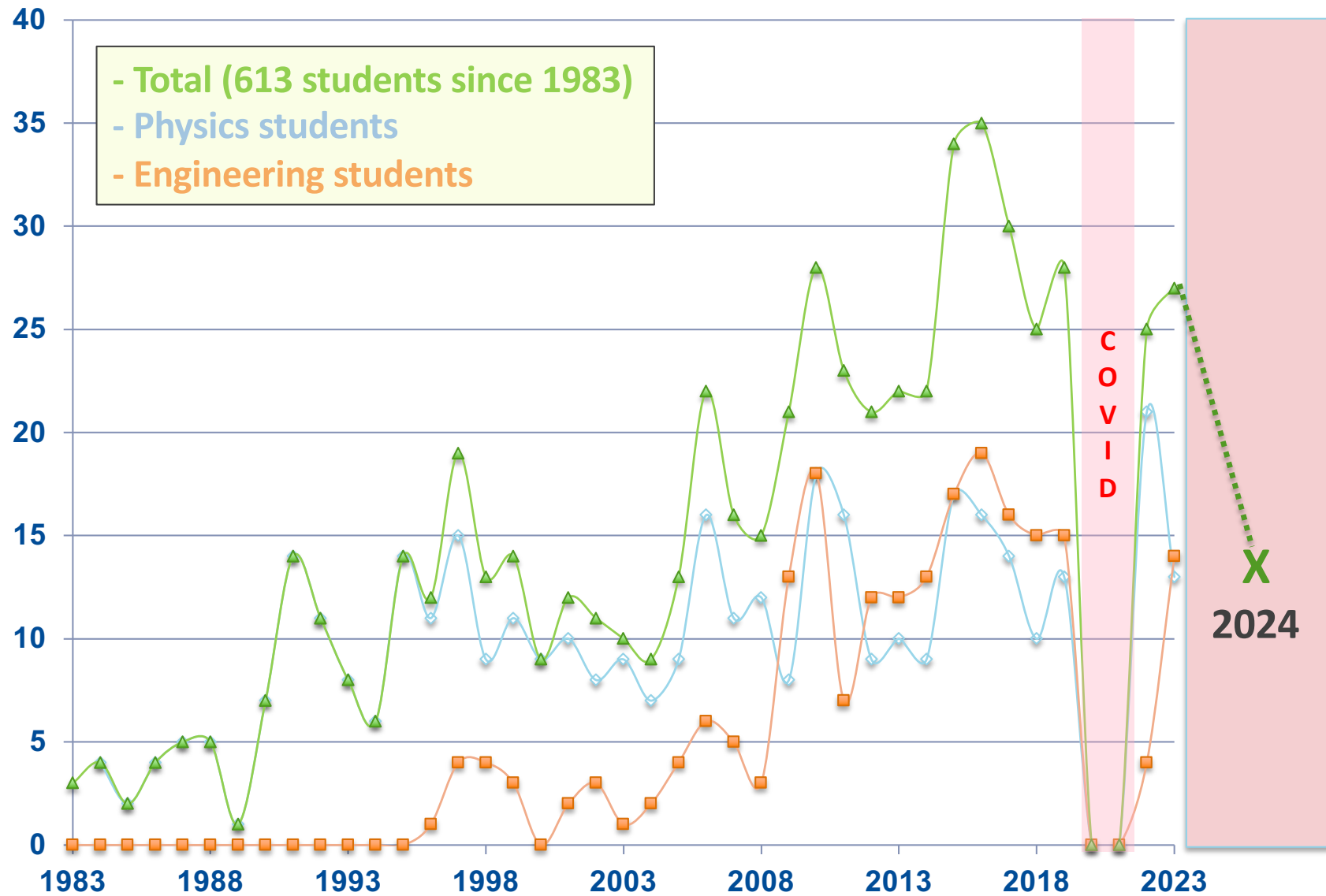
- Valid passport
- Employment and J1 Visa bureaucracy with the help of Fermilab's administrative offices



Important Actions/Dates

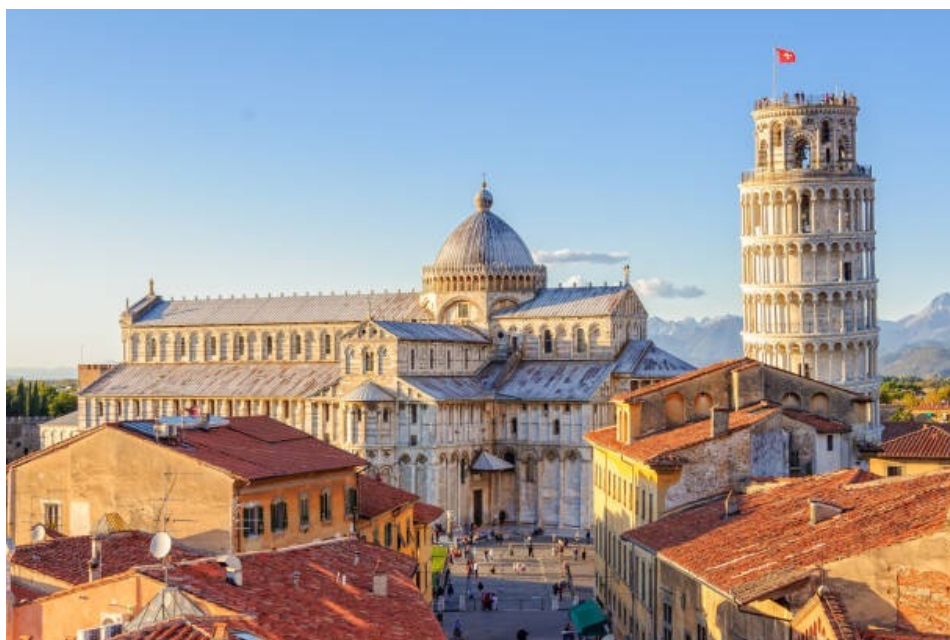


Summer Students Statistics (1983 – 2024)



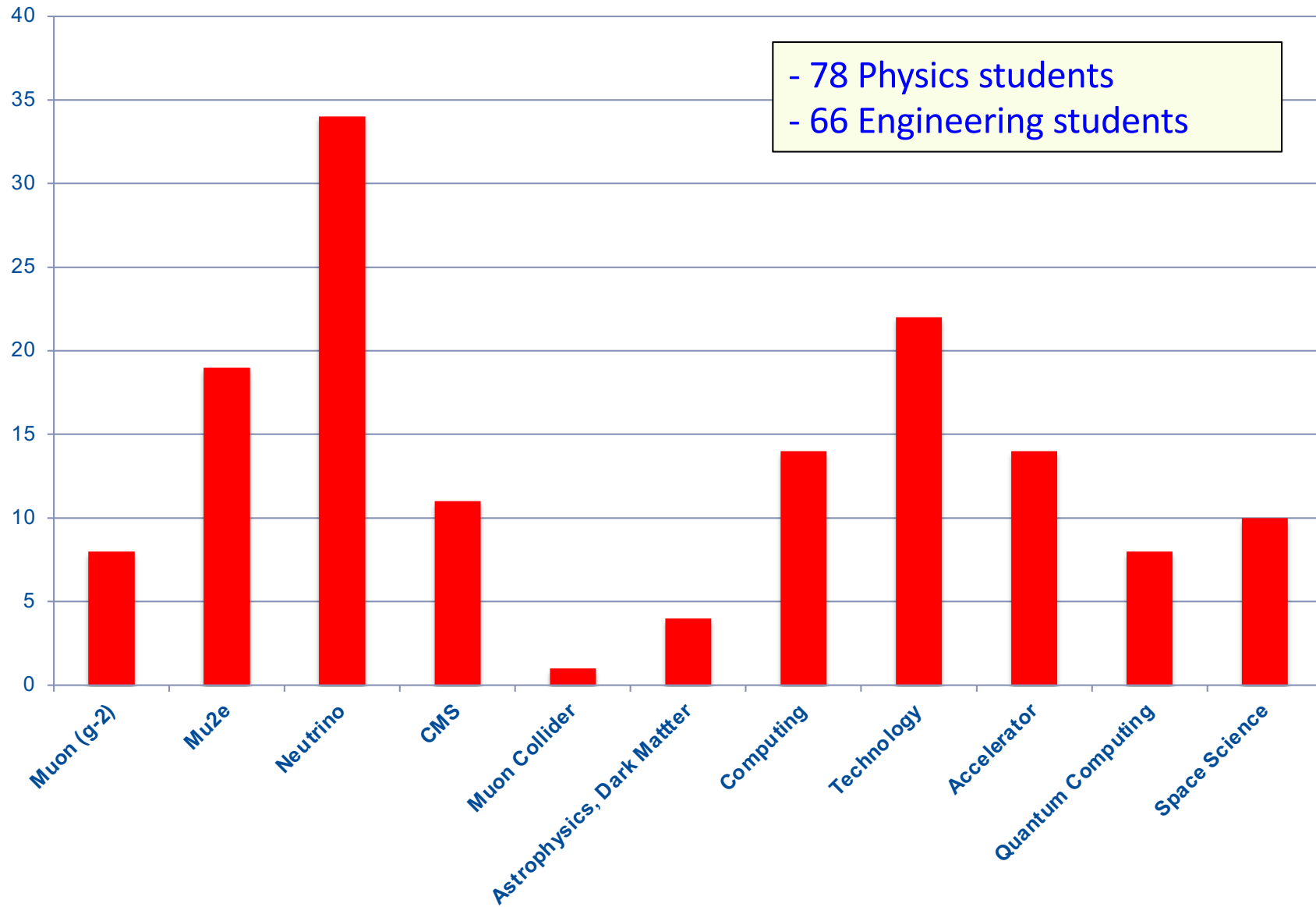
Summer Students Statistics (1983 – 2024)

Involved Universities (1983-2024)	613 students
Pisa	52%
Roma	10%
Padova	8%
Milano	8%
Bologna	7%
Torino	2%
Trieste	2%
Napoli	2%
Ferrara	1%
Cassino	<1%
Udine	<1%
Siena	<1%
Firenze	<1%
Parma	<1%
Palermo	<1%
Messina	<1%
Lecce	<1%
L'Aquila	<1%
Ancona	<1%
Bari	<1%
Genova	<1%
International	1%

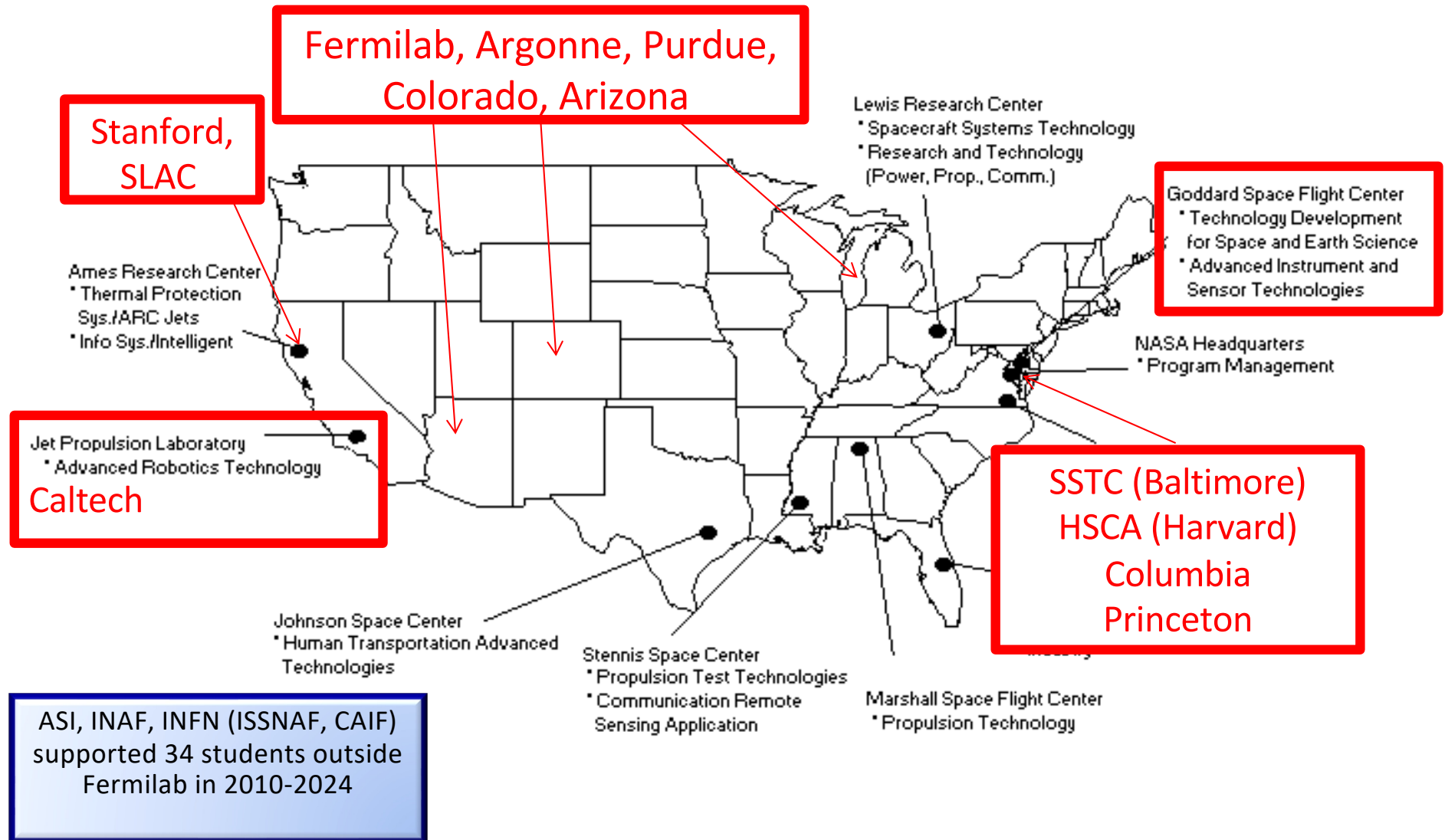


Training Programs (2008-2024)	333 students
Particle Physics & Neutrino	62%
Technology	20%
Accelerator	10%
Computational Science/AI	8%

Training Programs (2017-2024, last 6 “years”)



Internships at Space Science Labs



Conclusions

THE ITALIAN SUMMER STUDENTS PROGRAM AT FERMILAB

- A multi-disciplinary 9-week internship for Physics and Engineering students
- Hands-on training on Fermilab high-tech research
- 2024 program begins soon (13 Summer Students)

~**600 SUMMER STUDENTS IN THE PROGRAM SINCE 1983**

- Many former Summer Students have developed their career at Fermilab with a Master Thesis and a PhD



EU FUNDED MOBILITY PROGRAMS

Simone Donati, EIC – Italy Meeting, June 27 - 28, 2024, INFN Bologna

EU FUNDED MOBILITY PROGRAMS
(up to year 2026, lots of pm)

NEWS	risenews.df.unipi.it
INTENSE	risentense.df.unipi.it
PROBES	riseprobes.df.unipi.it
SENSE	sesense.df.unipi.it

EU FUNDED DOCTORAL PROGRAM
(up to year 2024 & 11 ESR)

INTENSE	itnintense.df.unipi.it
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INVOLVED EXPERIMENTS

Fermi-LAT	Virgo		MEG-II	
LIGO	KAGRA		Mu3e	COMET
		MUON CAMPUS		
CLAS12	SBS		MicroBooNE	ICARUS
HPS	BDX		SBND	
			ProtoDUNE	DUNE

EU BENEFICIARIES

INFN, CNRS, GLASGOW, CEA (+many more, including private companies)

AND NON-EU PARTNERS

FNAL, JLAB (+many more)

EASY TO ADD NEW INSTITUTIONS



An Example: PROBES (March 1, 2022 – Feb 28, 2026) (riseprobes.df.unipi.it)

Project Number ¹	101003460	Project Acronym ²	PROBES
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One form per project

General information

Project title ³	Probes of new physics and technological advancements from particle and gravitational wave physics experiments. A cooperative Europe - United States - Asia effort.
Starting date ⁴	01/03/2022
Duration in months ⁵	48
Call (part) identifier ⁶	H2020-MSCA-RISE-2020
Topic	MSCA-RISE-2020 Research and Innovation Staff Exchange
Fixed EC Keywords	Nuclear physics, nuclear structure, Fundamental interactions and fields, Neutrino oscillations, Gravitational waves, Particle physics, experiment
Free keywords	Flavour physics, neutrino oscillations, charged lepton flavour violation, dark matter, nuclear structure, black holes, neutron stars, gravitational wave detectors/physics, particle accelerator physics

PROBES continued-I

WP Number ⁹	WP Title	Lead beneficiary ¹⁰	Start month ¹²	End month ¹³
WP1	Hadron Physics: Detectors	1 - INFN	1	48
WP2	Hadron Physics: Data Analysis	11 - UGLS	1	48
WP3	LFV Experiments: Detectors	7 - IMPERIAL	1	48
WP4	LFV Experiments: Data Analysis	6 - PSI	1	48
WP5	Gravitational Waves: Detectors	14 - EGO	1	48
WP6	Multi-Messenger Physics	8 - CNRS	1	48
WP7	Dissemination and Outreach	15 - IFAE	1	48
WP8	Transfer of Knowledge	3 - CERN	1	48
WP9	Management	1 - INFN	1	48
WP10	Ethics requirements	1 - INFN	1	48

PROBES continued-II

PROBES Beneficiaries			Hadron Physics	LFV Physics	Gravitational Waves Physics
1	INFN	Italy	X	X	X
	CAEN	Italy		X	
	CERN	Switzerland		X	
	Clever Operation	France		X	
5	University of Bern	Switzerland		X	
	PSI	Switzerland		X	
	Imperial College	United Kingdom		X	
	CNRS	France	X		X
10	Georgian Technical University	Georgia		X	
	Technical University Dresden	Germany			X
	University of Glasgow	United Kingdom	X		
	CEA	France	X		
	University of Pisa	Italy		X	X
	European Gravitational Waves	Italy			X
	IFAE	Spain			X
15	Astrocent	Poland			X
	Nikhef	Netherlands			X
	Karlsruhe Institute of Technology	Germany			X
	University of Liverpool	United Kingdom		X	
	Sant'Anna Pisa	Italy		X	
20	Seems IKE	Greece			X

PROBES continued-III

PROBES Partners					
			Hadron Physics	LFV Physics	Gravitational Waves Physics
1	FNAL			X	
	KEK			X	
	JLAB		X		
	Caltech				X
5	MIT				X
	University of Tokyo				X
	University of California				X
	Chinese Academy of Science				X
	University of Hong Kong				X
10	Princeton University			X	
	Johns Hopkins University				X

EU Financial Support: 4600 euro/pm

Next initiative could be Hadron Physics + LFV Physics