Welcome to... Particle Physics

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University of Milano Bicocca

Welcome Day Physics MSc
U6-10, 1.10.2026

What Does a Particle Physicist Do?

Different Paths in Particle Physics

Pure Experimentalist

Builds the detectors
Expert in Hardware,
Electronics and Vacuum

Data Analyst

Analyses recorded data.
Expert in Statistics and
Computer Programming

Phenomenologist

Applies Theory
Calculates cross sections and
makes signal predictions

Suggested Path

Curriculum B: Particle Physics path

Type of Educational Activity / Area	ECTS Area	Codes	Courses	ECTS	SSD	Semester
Core – Experimental and Applied	22	F1703Q018	LABORATORY OF NUCLEAR AND SUBNUCLEAR MEASUREMENTS I	10	FIS/01	I
		F1703Q019	LABORATORY OF NUCLEAR AND SUBNUCLEAR MEASUREMENTS II	6	FIS/01	II
		F1703Q033	PARTICLE PHYSICS II	6	FIS/01	II
Core - Theoretical and Foundations of Physics	6	F1703Q053	THEORETICAL PHYSICS I	6	FIS/02	I
Core - Microphysics of Matter and Fundamental Interactions	12	F1703Q032	PARTICLE PHYSICS I	6	FIS/04	I
		F1703Q048	(*) RIVELATORI DI RADIAZIONI	6	FIS/04	I
Related / Supplementary Educational Activities	18	F1703Q008	EXPERIMENTAL METHODS IN HIGH ENERGY PHYSICS	6	FIS/04	II
		F1703Q034	PARTICLE PHYSICS III	6	FIS/01	II
		F1703Q051	STATISTICS AND DATA ANALYSIS	6	FIS/01	II
Elective course (chosen by the student)	12	**Choose two courses from the list:**				
		F1703Q026	MACHINE LEARNING APPLICATIONS	6	FIS/07	II
		F1703Q003	APPLIED ELECTRONICS	6	ING-INF/01	I
		F1703Q063	THEORETICAL PHYSICS II	6	FIS/02	I
		F1703Q055	THEORY AND PHENOMENOLOGY OF FUNDAMENTAL INTERACTIONS	6	FIS/02	II
			RADIOATTIVITÀ	6	FIS/04	II

ElectroWeak Physics - Gauge Bosons

Introduction to Particle Physics and QCD

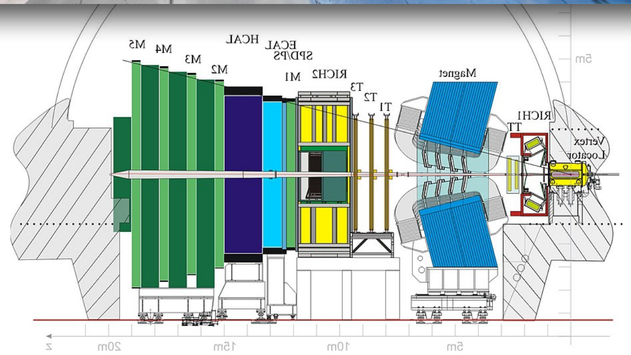
Flavor Physics - Quarks and Leptons

Thesis Opportunities

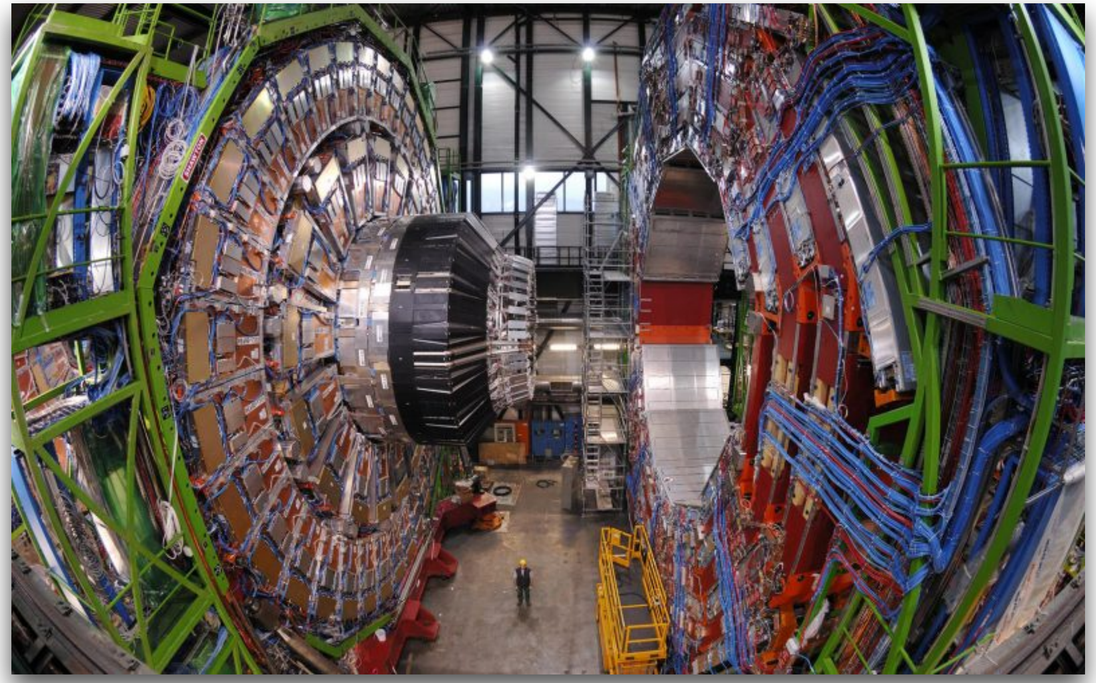
HEP at LHC

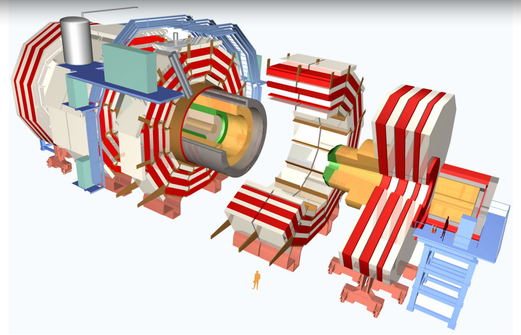
Flavour





Higgs+EW





Beyond...

FUTURE CIRCULAR COLLIDER

Suggested Path - HEP

Curriculum B: Particle Physics path

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		F1703Q003	APPLIED ELECTRONICS	6	ING-INF/01	I
		F1703Q063	THEORETICAL PHYSICS II	6	FIS/02	I
		F1703Q055	THEORY AND PHENOMENOLOGY OF FUNDAMENTAL INTERACTIONS	6	FIS/02	II

← **Hardware-oriented**

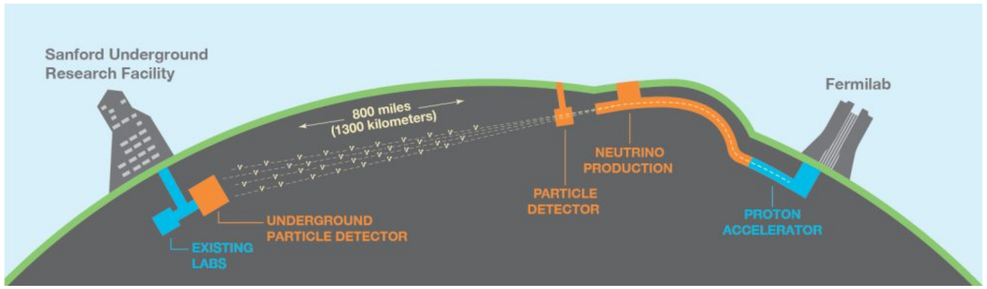
One of the two if Analysis-oriented

MONTE CARLO SIMULATION OF RADIATION DETECTORS **6** **FIS/04** **II** ← **Hardware-oriented**

Neutrino Physics

Oscillations





Mass and Nature





LEGEND

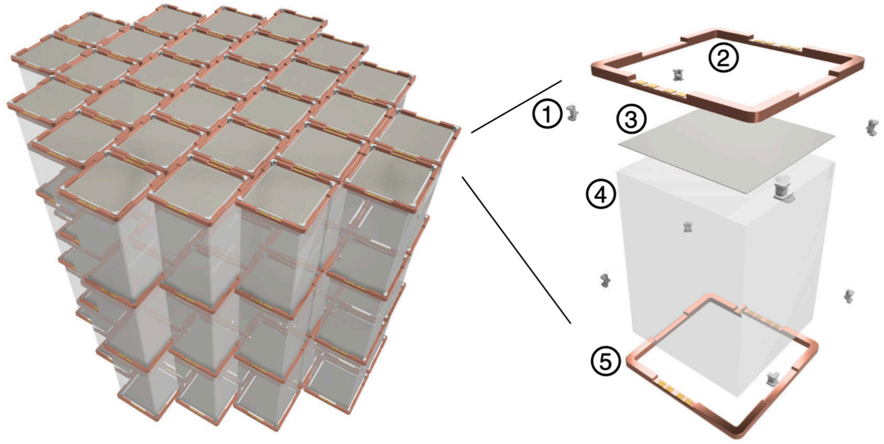
PTOLEMY

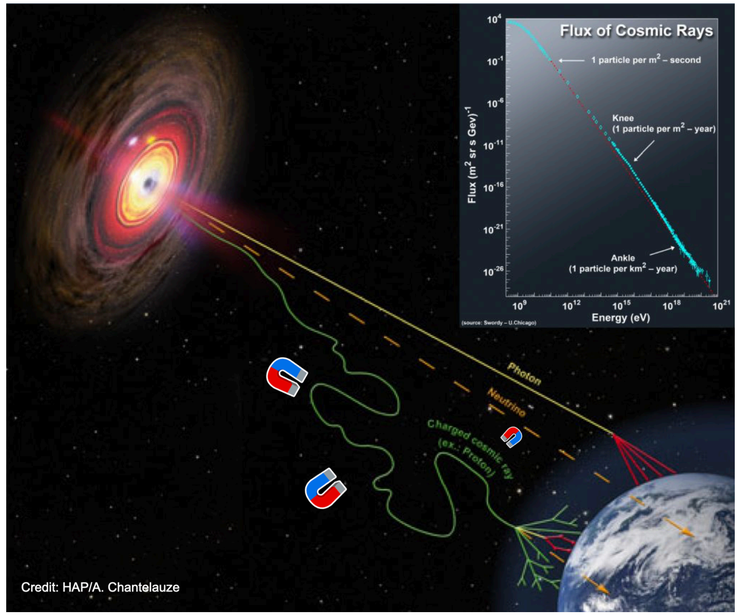
Suggested Path - Neutrino Physics

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			RADIOATTIVITÀ	**6**	**FIS/04**	**II**	← Highly Suggested
			MONTE CARLO SIMULATION OF RADIATION DETECTORS	**6**	**FIS/04**	**II**	← Hardware-oriented

Astroparticle and Gravitational Waves







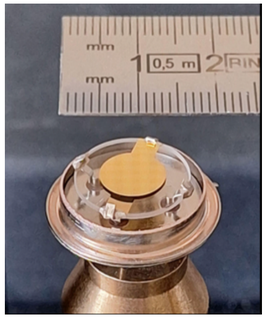
RES-NOVA



LIGO VIRGO

ET ITALY Einstein Telescope

EGO EUROPEAN GRAVITATIONAL OBSERVATORY



BAÙSCIA!

UNIVERSITÀ DEGLI STUDI DI MILANO BICOCCA

Suggested Path - Astroparticle and GW

Curriculum B: Particle Physics path

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		F1703Q055	THEORY AND PHENOMENOLOGY OF FUNDAMENTAL INTERACTIONS	6	FIS/02	II

RADIOATTIVITÀ 6 FIS/04 II ← **Highly Suggested for Underground Exp.**

GENERAL RELATIVITY 6 FIS/02 I ← **Gravitational Waves**

MONTE CARLO SIMULATION OF RADIATION DETECTORS 6 FIS/04 II ← **Hardware-oriented**

← **Hardware-oriented**

Concrete Examples

https://unimibparticelle.github.io/theses-web/

