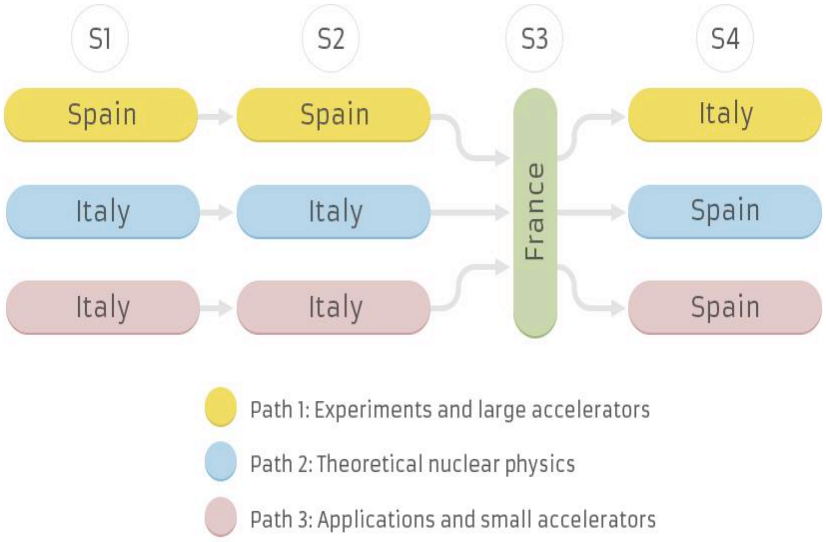
There will be three specialization paths:

- PATH 1: Experiments and Instrumentation in large accelerators. Students following this path (50% approx.) will start in Spain for S1 & S2, then go to France for S3 and finally will go to Italy (either UniPD-I or UniCT-I) for the Master Thesis in S4.
- PATH 2: Theoretical nuclear physics. Students within this path (25% approx.) will start in Italy (UniPD-I) for S1 & S2, then to France for S3 and, finally to Spain for the Master Thesis in S4.
- PATH 3: Applications and small accelerators. Students within this path (25% approx.) will start in Italy (Catania) for S1 & S2, then to France for S3 and, finally to Spain for the Master Thesis in S4.

The mobility scheme depending on the path selected is given in the following figure:



The general scheme ECTs distribution of the Course is presented in the following table, giving the number of credits associated to each module according to the mobility and specialization path:

PATH 1 - EXP: Large accelerators (~1/2 of the students*)
PATH 2 - THEO: Theoretical Nuclear Physics (~1/4 of the students*)
PATH 3 - APP: Small accelerators (~1/4 of the students*)

	MOD1	MOD2			MOD3	MOD4	MOD5
		EXP	THEO	APP			
PATH 1	24	24 or 12	12	12 or 24	6	12	30
PATH 2	24	12	36	0	6	12	30
PATH 3	24	12 or 24	12	24 or 12	6	12	30
Total	24	48			6	12	30

*) Experience coming from national Master degrees in previous years makes us to estimate that the number of students coming to path 1 will be around 50% of the total, while those selecting paths 2 and 3 will be around 25% in each itinerary.

The list of the courses offered in each University for semesters one, two and three each academic year is given in the table below for each path separately. Concerning semester 3, only 12 ECTS have to be obtained in regular courses, since 12 ECTS correspond to the

internship and 6 ECTS are assigned to a common course (module 3, see below) which is compulsory for all students. Semester 4 is devoted to the preparation of the Master thesis in a host institution, research centre or company (MOD 5).

The courses listed below should be understood for the first edition of the Master, some courses of the specific paths may be replaced in future editions by other courses under the approval by the Academic Committee of the Consortium.

MODULE 1 - basic nuclear physics and tools	MODULE 2 - advanced nuclear physics (EXP)	MODULE 2 - advanced nuclear physics (THEO)	MODULE 2 - advanced nuclear physics (APP)	MODULE 3- Common Advanced Course	MODULE 4 – Internship	MODULE 5 – M*aster* Thesis

PATH 1: Experiments, instrumentation and large accelerators (1/2 of the students)

Spain S1	Basic Experimental Nuclear Physics (6)	Quantum Mechanics (6)	Atomic and Molecular Physics (6)	Advanced Experimental Techniques in Nuclear Physics (6)	Applied Nuclear Physics I (6)
Spain S2*	Nuclear Structure: properties and models (6)	Applied Nuclear Physics II (6)	Introduction to Nuclear Reactions (6)	Many-body Theories in Nuclear Physics (6)	Nuclear Astrophysics (6)
France S3	**Research Internship + Thesis project**	**Common Advanced course (6)**	**Choice between**		

	(12)		**Metrology and data analysis (6) + exp.nucl.phys.+accelerators (6)**	
			Applications for therapy (12)	
Italy S4	**Master thesis on experimental nuclear physics, instrumentation large accelerators (30)**			

***Lectures on subjects in S2 will be concentrated in one intensive teaching week for each topic in different Universities. List of dates and places for each course will be given in advance.**

PATH 2: Theoretical nuclear physics (1/4 of the students)

UniPD-I S1	Theoretical Physics (6)	Theoretical Physics of Fundamental Interactions(6)	Nuclear Physics (6)	Physics Laboratory (6)	Radioactivity and Nuclear Measurements (6)
UniPD-I S2	Subnuclear Physics (6)	Introduction to Many-Body Theory (6)	Introduction to radiation detectors (5) + Introduction to the world of work (1)	Nuclear Astrophysics (6)	Advanced Physics Laboratory A (6)
France S3	**Research Internship + Thesis project (12)**	**Common Advanced course (6)**	**Choice between**		
			Theoretical nuclear, atomic and collision physics (12) (Strongly recommended for this path)		
			Metrology and data analysis (6) + exp.nucl.phys.+accelerators (6)		

Spain S4	**Master thesis on theoretical nuclear physics (30)**

PATH 3: Applications and small accelerators (1/4 of the students)

Catania S1	Meccanica Quantistica Avanzata (Advanced Quantum Mechanics)(6)	Tecniche Nucleari Avanzate applicate alla Medicina/ Radiattività Ambientale (Advanced Nuclear Techniques Applied to Medicine/ Environmental Radioactivity) (6)	Meccanica Statistica Avanzata (Advanced Statistical Mechanics) (6)	Lab. Fisica Nucleare e Subnucleare (Nuclear & Subnuclear Physics Lab.) (6)	Fisica Nucleare e subnucleare (Nuclear and Subnuclear Physics) (6) or Struttura Nucleare (Nuclear Structure) (6)
Catania S2	Teoria delle reazioni nucleari (Nuclear Reaction Theory) (6)	Teoria delle Interazioni Forti (Theory of the Strong Interaction) (6)	Astrofisica nucleare (Nuclear Astrophysics) (6)	Metodi Sperimentali per la Fisica Nucleare/Laboratorio di Fisica dell'Ambiente (Experimental Nuclear Physics / Environmental Physics Lab) (6)	Archeometria / Fisica degli Acceleratori e Applicazion (Archeometry / Accelerator Physics and Applications) (6)

<table>
<tr><td rowspan="3">France S3</td><td rowspan="3">Research Internship + Thesis project (12)</td><td rowspan="3">Common Advanced course (6)</td><td>Choice between</td></tr>
<tr><td>Metrology and data analysis (6) + exp.nucl.phys.+accelerators (6)</td></tr>
<tr><td>Applications for therapy (12)</td></tr>
<tr><td>Spain S4</td><td colspan="3">Master thesis on applications and small accelerators (30)</td></tr>
</table>

All Courses will be taught in English and the students will be provided with the appropriate academic material in English.

It is important to note that in addition to the participant Universities, the associated Labs and Companies can be the hosts for internship and Master Thesis development. In particular, the following associated research centres could be the host for students: CERN (Geneva, Switzerland), the National Laboratory at Legnaro (Padova, Italy), National Laboratory del Sud (Catania, Italy), National Accelerator at GANIL (Caen, France), GSI Accelerators (Darmstadt, Germany), National Centre Accelerator (Seville, Spain), Accelerator Centre at Madrid (Madrid, Spain), CSIC (IEM, Madrid and IFIC, Valencia), and CIEMAT (Madrid, Spain).