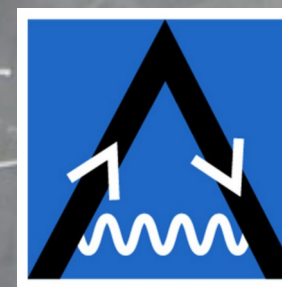




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International Master
Advanced Methods
in Particle Physics

Welcome to the

Erasmus Mundus Joint Master of Advanced Methods in Particle Physics (IMAPP) Cohort 2026/27

Angelo Carbone, Kevin Kröninger, Stephane Monteil

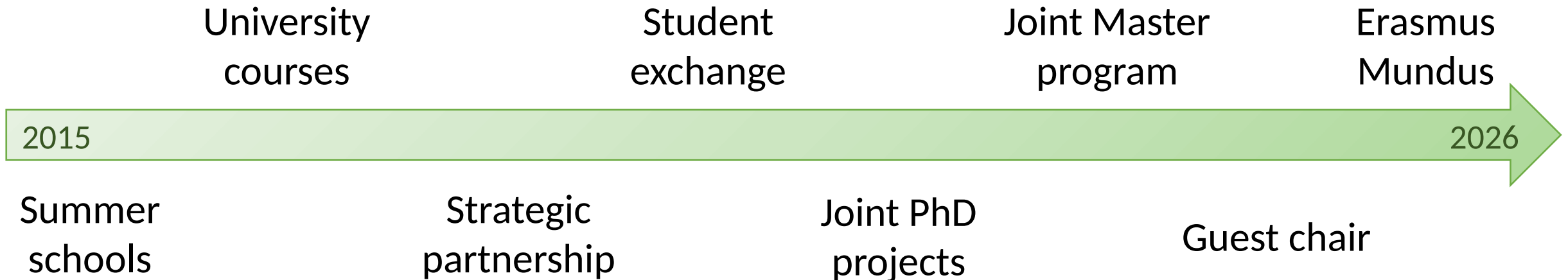
www.imapp.eu

The BCD network

The idea:

- The BCD network are scientists from Bologna, Clermont, and Dortmund
- We are all actively working in experimental or theoretical particle physics
- We share the idea of a **common and international education in the field of particle physics**
- We do have quite some experience in organizing international summer schools (on beautiful Corsica), European funding, joint doctoral projects, etc.

Our common history:



The BCD network

ERASMUS mundus? – Kevin Alexander Kroeninger – Outlook – Mozilla Firefox

https://outlook.office365.com/mail/AAMkADc3NWNhM2UyLTE1ZTktnGRjNC05ZDE5LTlxYWMxZjEwYTBMZgAuAAAAAADRGnu:

Löschen Archivieren Melden

ERASMUS mundus?

Kevin Alexander Kroeninger
An: angelo.carbone@bo.infn.it; Maximiliano Sioli; Jean Orloff <jean.orloff@uca.fr>; Stephane Monteil; gudrun.hiller@uni-dortmund.de

Mi, 20.03.2019 17:08

Dear all,

since we are in our fifth year of collaboration and have been successful in a lot of actions, I would like to come back to one of our original motivations, namely a joint education on the Master level. One possibility to do that is to apply for the ERASMUS mundus program:

https://ec.europa.eu/programmes/erasmus-plus/opportunities/individuals/students/erasmus-mundus-joint-master-degrees_en

and here

https://eu.daad.de/medien/eu.daad.de.2016/dokumente/infos-fuer-hochschulen/antragstellung/erasmus-mundus-joint-master-degrees/20151110_emjmd_antragstellung.pdf

The idea is to exchange students during their Master and to issue common or joint Master degrees. The current round of applications ended mid-February, so if we would like to do this, we have about a year to write a meaningful application.

Is this something you are interested in? I am sure it will be a lot of work to write an application and to organize this, but I would be willing to invest the time.

Cheers,

Kevin

Prof. Dr. Kevin Kröninger

International character

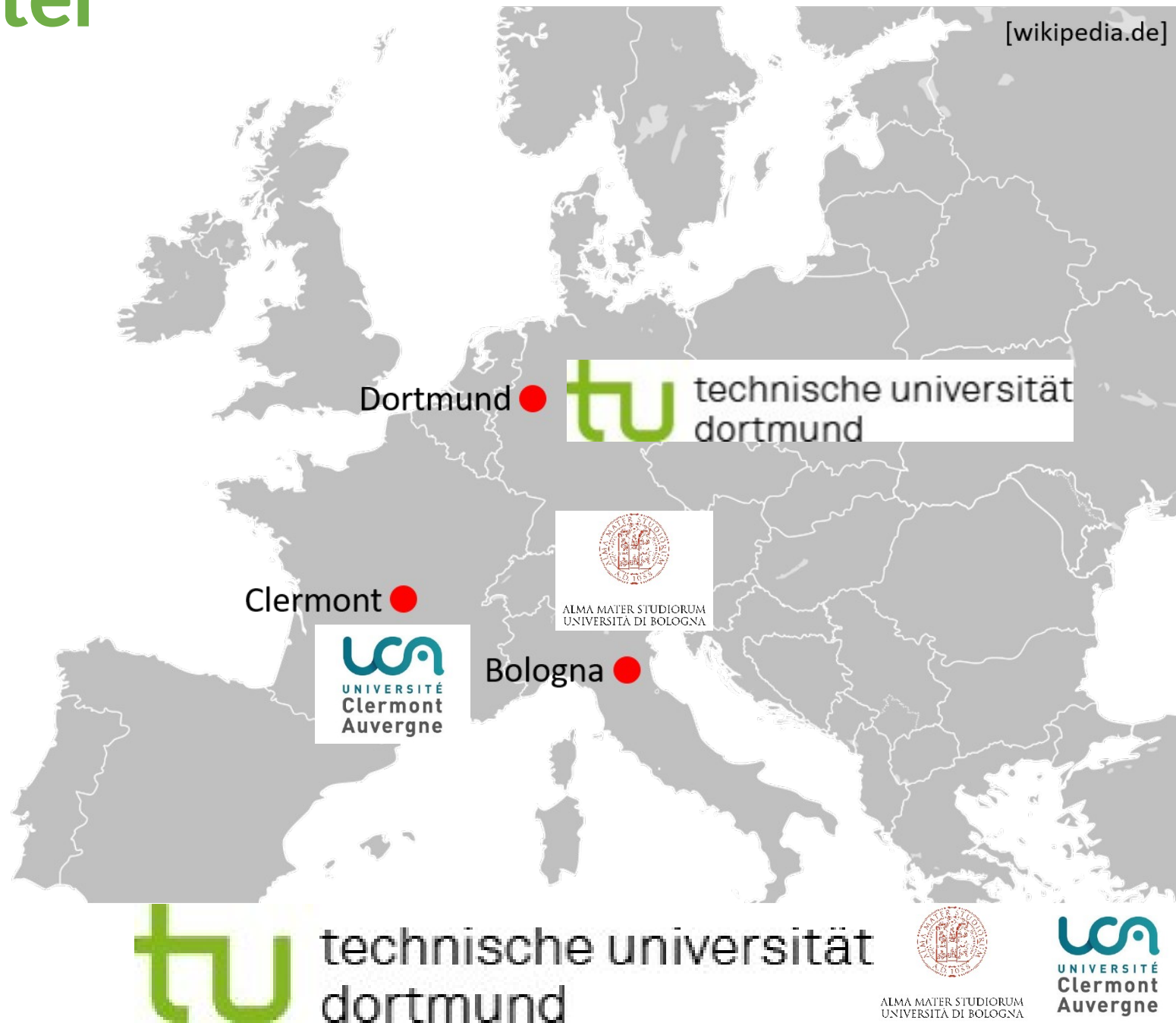
[wikipedia.de]

Universities:

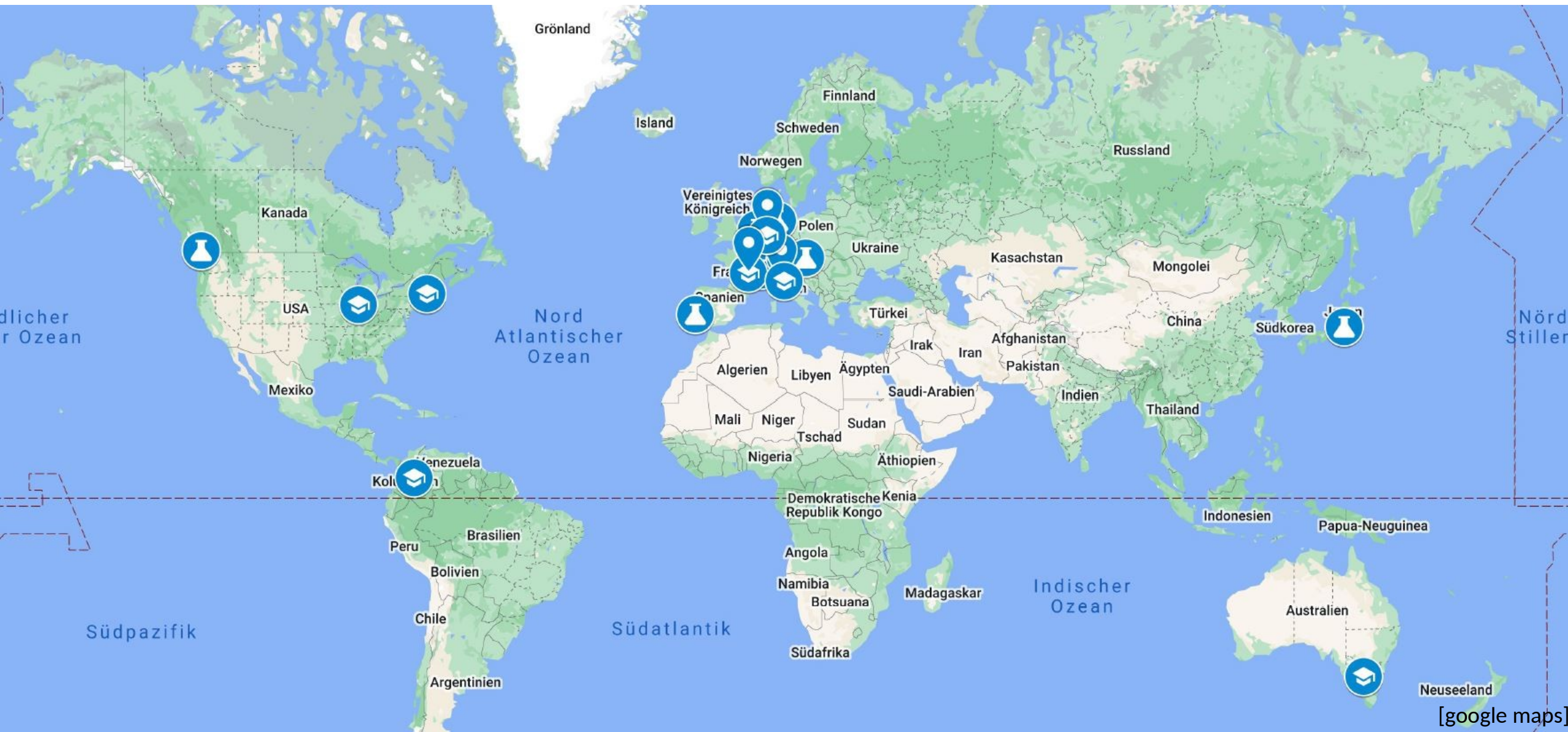
- University of Clermont Auvergne
- TU Dortmund University
- University of Bologna

Associated partners:

- International research laboratories
- Research networks
- Universities around the world
- Companies



International character



[google maps]

International character

Universities:

- Massachusetts Institute of Technology, Cambridge, USA
- Monash University, Clayton, Australia
- Purdue University, West Lafayette, USA
- TU Dortmund University
- Universidad Nacional de Colombia, Bogota, Colombia
- University of Bologna
- University of Clermont Auvergne

Companies:

- Aegetis, Aubière, France
- E4 Computer Engineering. SpA, Scandiano, Italy
- Point-8 GmbH, Dortmund, Germany

Research laboratories:

- Brookhaven National Lab, Brookhaven, USA
- CERN, Geneva, Switzerland
- DESY, Hamburg, Deutschland
- HEPHY / TU Wien, Vienna, Austria
- INFN, Italy
- IN2P3, France
- NIKHEF, Amsterdam, Netherlands
- Laboratory of Instrumentation and Experimental Particle Physics (LIP), Portugal
- MPI for Physics, Munich, Germany
- TRIUMF, Vancouver, Canada
- High Energy Accelerator Research Organization (KEK), Tsukuba, Japan

Master program

Education:

- Physics: Experimental and theoretical particle physics — Scientific case
 - Methods:
 - Instrumentation and detector physics
 - Large-scale scientific computing and programming
 - Statistical data analysis and machine learning
- } Technical aspects,
relevant for employability

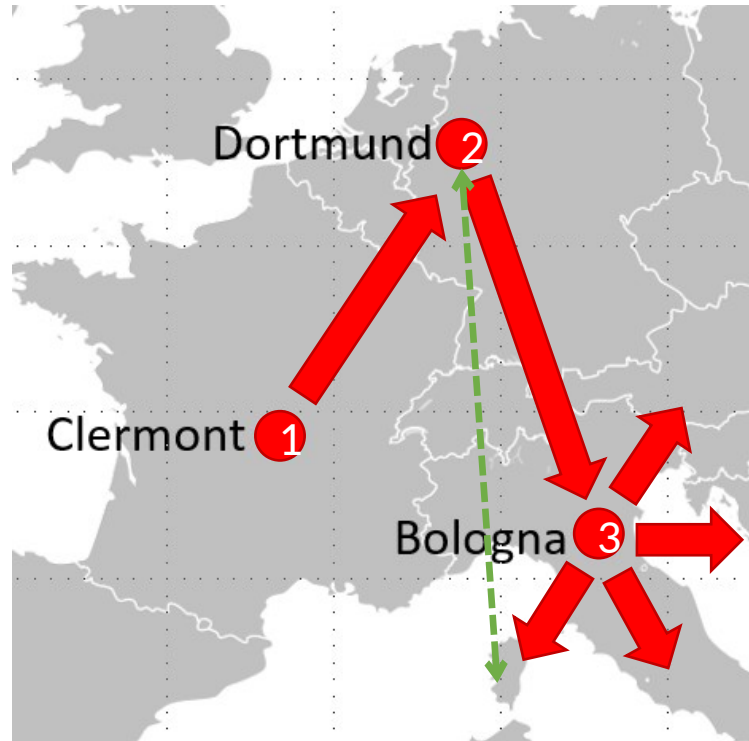
Courses:

- Mandatory courses from the realm of theoretical and experimental particle physics
- Mandatory courses on methods
- Specialization possible by choosing elective courses

Issued degree:

- A single joint degree signed by all three universities
- Acknowledged as Master of Science degree in physics

Mobility



Schedule:

Sem.	Location	Academic focus	Events
1 (Winter)	Clermont	Particle physics and statistics	Orientation days
2 (Summer)	Dortmund	Particle physics and detectors	Spring school
3 (Winter)	Bologna	Particle physics and computing, introduction Master thesis	Trade fair for Master theses
4 (Summer)	Any	Master thesis	Industry seminar

Teaching

Modules and courses:

- All courses will be given in English (lectures, seminars, lab courses)
- Most, if not all, courses will also be offered to local students
- A module can correspond to a single course or a combination of several courses, e.g. a lecture plus a lab course
- Most modules finish with an exam (written or oral) which can be retaken twice (only if failed)
- All courses are meant as in-person classes, we usually do not offer ZOOM connections
- Depending on the schedule, you can do the exams in-person or online

Beyond teaching

Additional offers:

- Language courses (French, German, Italian, English)
- My personal note: Please use those and obtain the offered certificates!
It is very helpful/sometimes necessary if you want to find work in one of the countries after the end of the programme!
- All university offers (sports, library, internet, additional support, etc.)
- Check out the international offices and their events, students activities, etc.

Support:

- We offer academic advice
- Please do not hesitate to contact us in case there are other problems
- Please also check local offers, e.g. counseling, health services, special needs, etc.

Study plan

Semester 1: Clermont

No.	Module	ECTS	Comments
	Compulsory modules		
IMAPP-01-01	Introduction to quantum field theory and gauge theories	6	
IMAPP-01-02	Introduction to particle physics and the experimental foundations of the Standard Model	9	
IMAPP-01-03	Programming and data analysis	6	
IMAPP-01-04	Statistics and artificial intelligence	6	
	Elective modules		
IMAPP-01-04	Physics elective course	3	
IMAPP-01-05	UCA particle physics seminar	3	

Study plan

Semester 2: Dortmund

No.	Module	ECTS	Comments
	Compulsory modules		
IMAPP-02-01	Model building in particle physics	6	
IMAPP-02-02	Experimental aspects of particle physics measurements	6	
IMAPP-02-03	Detector systems in particle and medical physics	9	Lecture + lab course
IMAPP-02-04	Spring/summer school	3	in Cargese (Corsica)
	Elective modules		
IMAPP-02-05	Electronics lab course	6	
IMAPP-02-06	Modern particle physics	6	
IMAPP-02-07	Astroparticle physics	6	
IMAPP-02-08	Guest lecture on instrumentation	3/6/9	only if applicable

Study plan

Semester 3: Bologna

No.	Module	ECTS	Comments
	Compulsory modules		
IMAPP-03-01	Advanced Standard Model	6	
IMAPP-03-02	Phenomenology and experimental flavor physics	6	
IMAPP-03-03	Computer science for high energy physics	12	
IMAPP-03-04	Preparation for scientific research and internship orientation	6	Preparation for Master thesis

Study plan

Semester 4: Any of the three universities or a partner institution

No.	Module	ECTS	Comments
	Compulsory modules		
IMAPP-04-01	Final examination	12	Will take place in Dortmund
IMAPP-04-02/03/04/05	Master thesis (preparation for final examination)	18	Can be done anywhere

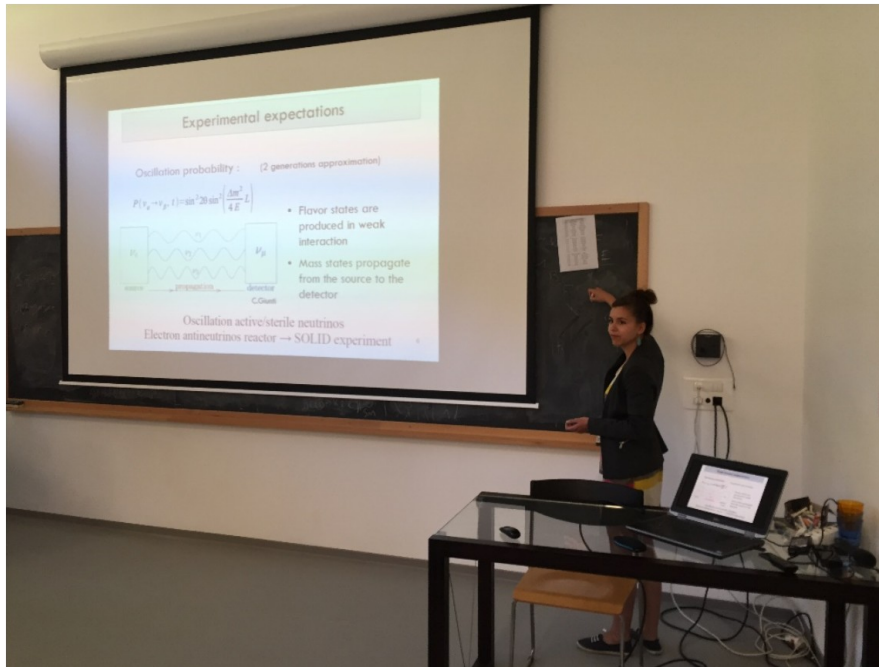
Notes on the Master thesis:

- There will be a trade fair and/or seminar for Master theses during the third semester. Our partners will present possible topics.
- There is a 6 CP course for the preparation of the Master thesis, you can discuss several options with potential supervisors.
- The Master thesis will take half a year, mostly from the beginning of March to the beginning of September
- The final examination is basically a presentation of the results of the Master thesis and will take place in one of the partner institutions at the end of September.

Special events

Spring / summer school (second semester)

- Since 2015 in Cargese, Corsica (France)
- One week school on advanced particle physics
- Lectures on current topics in particle physics, presentations by students, discussion and exercise sessions



Special events

Academic trade fair / seminar as preparation for scientific research and internship orientation (third semester)

- Presentations by associated partners on particle-physics topics
- Introduction of the universities, institutes and companies
- If possible, presentation of possible Master thesis projects

Industry seminar (fourth semester)

- Motivation: get in touch with relevant branches in industry close to finishing the Master program
- (Virtual) meeting with industry partners and guests.
- Presentations on the field that the company is active in, what their company does, how everyday life in the company looks like, how they recruit employees, etc.
- Time for discussion with the partners and guests
- Personal note: please attend these to know what companies are looking for!

Status and plans

Status

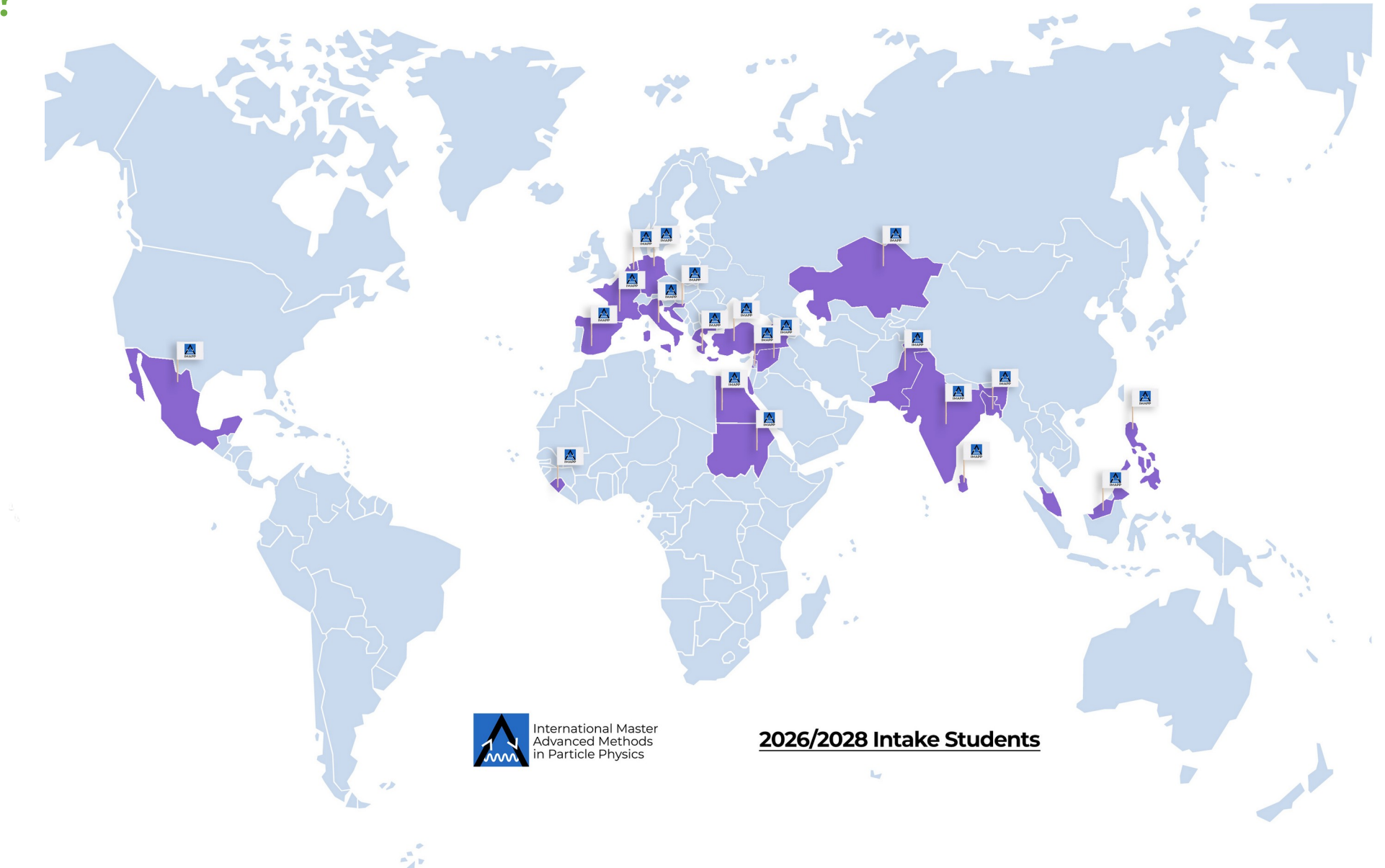
- Fully accredited in France, Germany and Italy. Procedure followed the European approach
- Program was installed in the academic year 21/22
- Composition of intakes:
 - First intake: 7 students (6 IT/1 FR)
 - Second intake: 10 students (4 IT/3 FR/2 DE/1 ES)
 - Third intake: 35 students from 6 continents
 - Fourth intake: 26 students from 18 countries
 - Fifth intake: 30 students from 18 countries
 - Sixth intake: about 39 students from 21 countries!
- Program is running smoothly so far, initial hickups have been largely solved



FAQ

- Further information: www.imapp.eu

Where are you from?



2026/2028 Intake Students

Information

Information about the Master:

- Communication via the IMAPP website www.imapp.eu
- We will make a place available to store information, e.g. these slides, the examination regulation, the module descriptions, etc.
- We will inform you via email about the most important aspects, e.g. housing opportunities in Dortmund for the next semester
- Social media channels

Housing:

- Clermont-Ferrand: I hope you are all set
- Dortmund: pre-booking in December 2026
- Bologna: difficult, organize early (summer term 2026)

Visa:

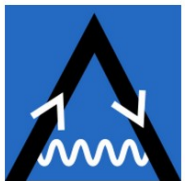
- Please get in touch with me (Andrea) → we prepare information for your stay in Germany

The team

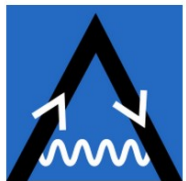
Organizers:

- Clermont-Ferrand: Stephane Monteil
- Dortmund: Kevin Kröninger
- Bologna: Angelo Carbone
- Global management: Andrea Knue
- Multimedia: Carlo Venturi

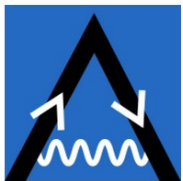
Teachers:



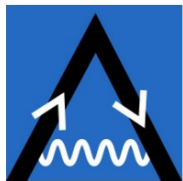
Prof. Dr. Vincent
Morénas
UNIVERSITY OF CLERMONT AUVERGNE



Dr. Ana Teixeira
UNIVERSITY OF CLERMONT AUVERGNE



Dr. Violaine Antoine
UNIVERSITY OF CLERMONT AUVERGNE



Dr. Andreas Goudelis
UNIVERSITY OF CLERMONT AUVERGNE



Prof. Jean Orloff
UNIVERSITY OF CLERMONT AUVERGNE



Prof. Dr. Heinrich Päs
TU DORTMUND UNIVERSITY



Prof. Maximiliano Sioli
UNIVERSITY OF BOLOGNA



Prof. Silvia Pascoli
UNIVERSITY OF BOLOGNA



Prof. Dr. Johannes
Albrecht
TU DORTMUND UNIVERSITY



Prof. Angelo Carbone
UNIVERSITY OF BOLOGNA



Prof. Olivier
Deschamps
UNIVERSITY OF CLERMONT AUVERGNE



Prof. Julien Donini
UNIVERSITY OF CLERMONT AUVERGNE



Dr. Jens Weingarten
TU DORTMUND UNIVERSITY



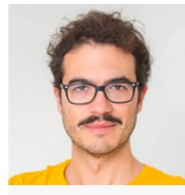
Prof. Dr. Wolfgang
Rhode
TU DORTMUND UNIVERSITY



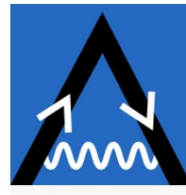
Dr. Chris Delitzsch
TU DORTMUND UNIVERSITY



Dr. Dirk Wiedner
TU DORTMUND UNIVERSITY



Prof. Davide Pagani
UNIVERSITY OF BOLOGNA



Prof. Francesco
Giacomini
UNIVERSITY OF BOLOGNA



Prof. Andrea Chierici
UNIVERSITY OF BOLOGNA



Dr. Romain Madar
UNIVERSITY OF CLERMONT AUVERGNE



Prof. Dr. Gudrun Hiller
TU DORTMUND UNIVERSITY



Prof. Kevin Kröninger
TU DORTMUND UNIVERSITY



Prof. Fabio Maltoni
UNIVERSITY OF BOLOGNA



Prof. Stephane Monteil
UNIVERSITY OF CLERMONT AUVERGNE

Funding for the BCD network



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DAAD



Université
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UNIVERSITÉ
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ITALO
FRANCESE

UCA
UNIVERSITÉ
Clermont
Auvergne



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

DFG Deutsche
Forschungsgemeinschaft

heinrichhertzstiftung



technische universität
dortmund

**Enjoy your stay in Clermont-Ferrand and
good luck with the IMAPP program!**

**We are looking forward to welcoming you in
Dortmund next year!**

Potential financial support

Erasmus Mundus

- Large EU project that aims at getting the best students from all over the world
- About 18 full stipends per intake: 1.400 Euro/month, no tuition fees, insurance coverage
- National quota: about 1.8 students from one country per intake

French German University

- Program with a focus on French-German relationship and cultural exchange
- Mobility support for all interested students: up to 350 Euro/month for up to 10 month over the course of an academic year when abroad (note details)

University of Clermont Auvergne

- Program to support best students
- Stipend of 4.000 Euro in total