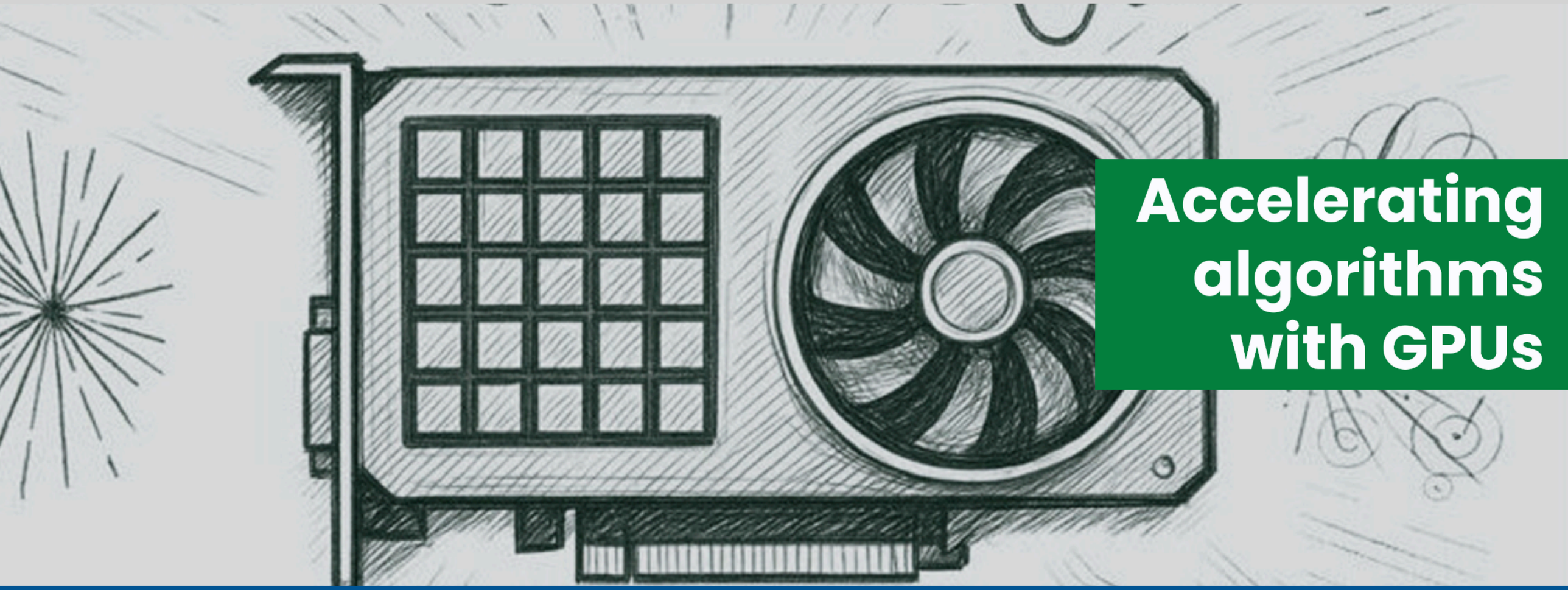


Accelerating algorithms with GPUs

Second Course on Porting code and algorithms to GPUs

ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA

DEPARTMENT
OF PHYSICS AND ASTRONOMY
"AUGUSTO RIGHI"

INFN
Istituto Nazionale di Fisica Nucleare

ICSC
Centro Nazionale di Ricerca in HPC,
Big Data and Quantum Computing

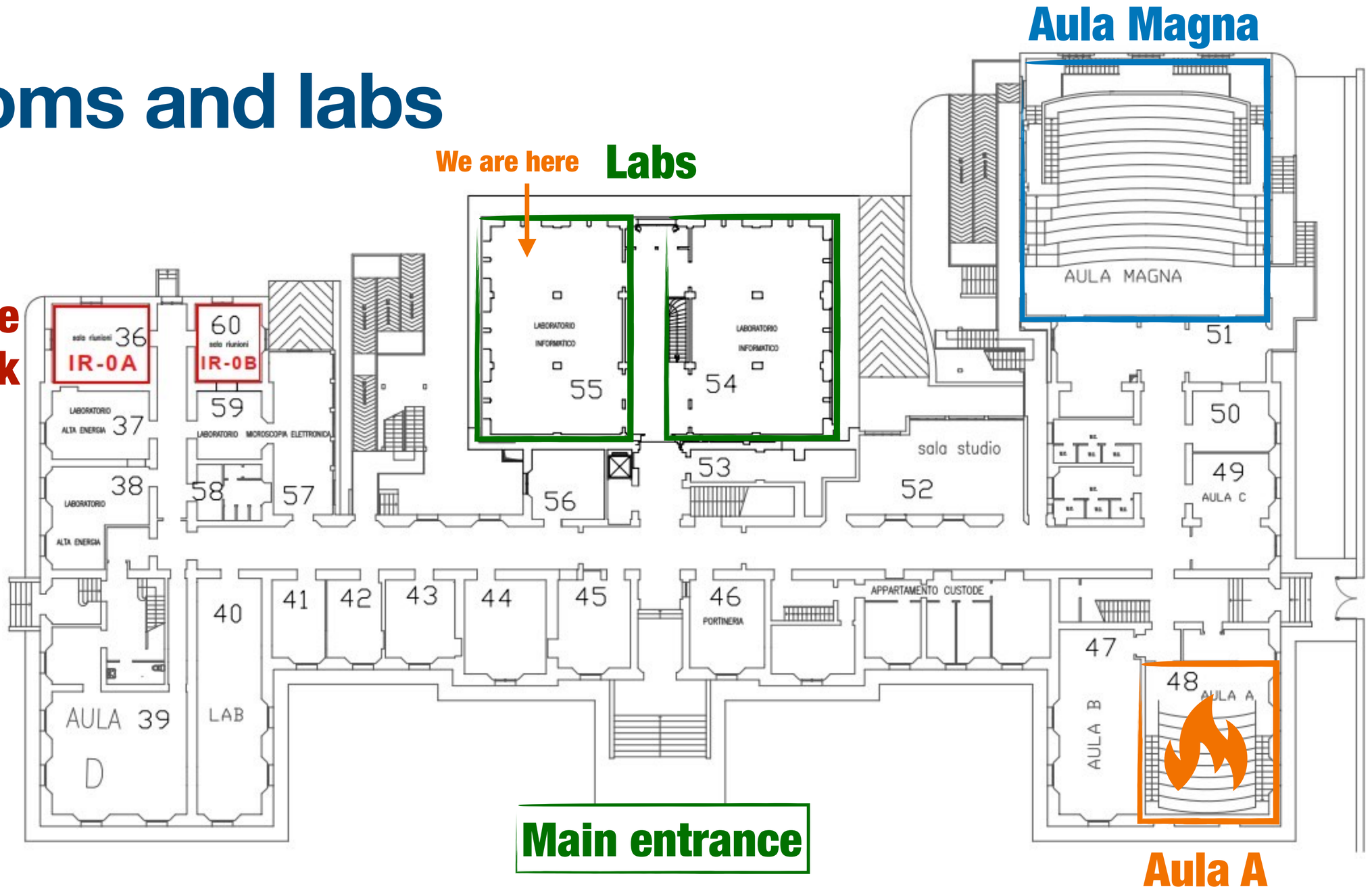
Welcome to Bologna!

And to the: ***“Second Course on Porting code and algorithms to GPUs”***

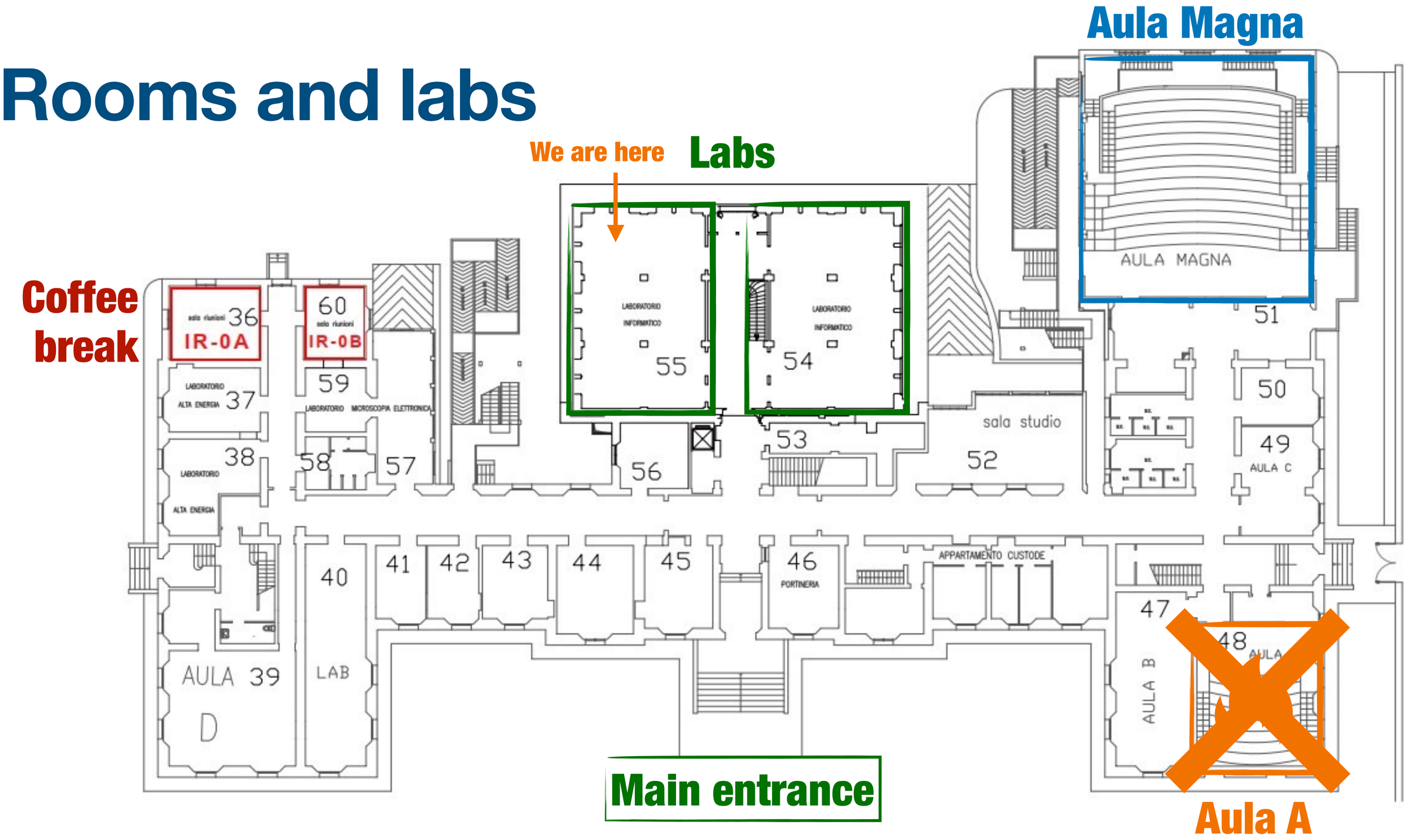
- Both **classes** and **hands-on** sessions will take place in this building
  - ~~**Aula A** *(this one)*~~
    Monday,
  - **Aula Magna**
    Tuesday, Thursday
  - **Aula D**
    Wednesday
  - **Laboratorio CLA and Aula II**
    Tuesday to Friday
- **Coffee** will be served in room **IR-0A**

Dipartimento di Fisica ed Astronomia - UNIBO
Historical building (v ia Irnerio 46)

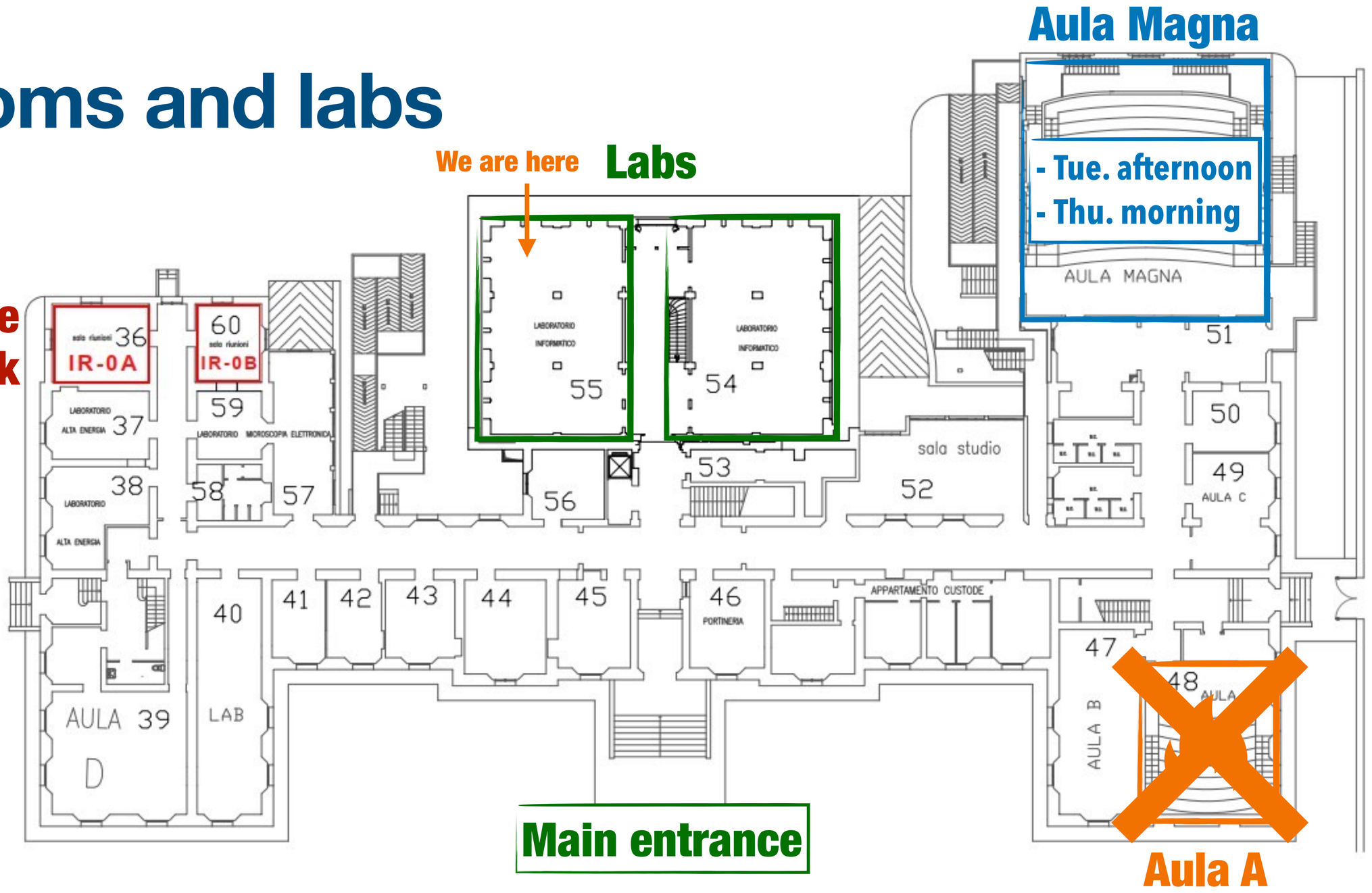
Rooms and labs



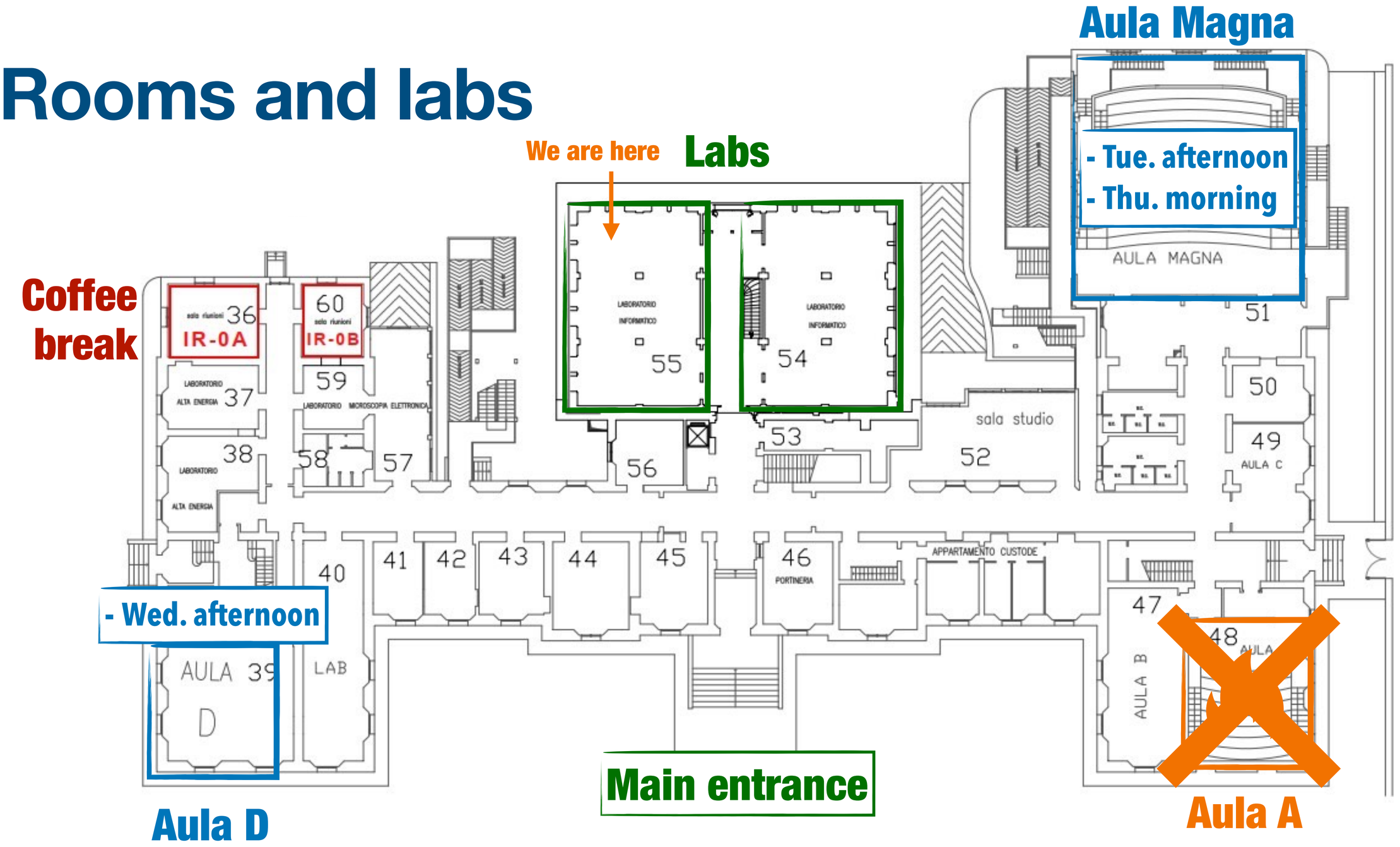
Rooms and labs



Rooms and labs



Rooms and labs



Your teachers

- Main lecturers: **Andrea Bocci**, **Felice Pantaleo**
- Facilitators: **Aurora Perego**, **Simone Balducci**
- Special Lecture *“Hyperparameter optimization with OPTUNA”*: ***Ümit Sözbilir***

Agenda *(Monday)*

14:00

Welcome (info & logistics) — *Alexis Pompili et al.*

Aula A, Dipartimento di Fisica e Astronomia — 14:00 - 14:30

Lecture GPU (part 1) — *Felice Pantaleo*

15:00

16:00

Aula A, Dipartimento di Fisica e Astronomia — 14:30 - 16:15

Coffe Break

IR-0A, Dipartimento di Fisica e Astronomia — 16:15 - 16:35

Lecture GPU (part 2) — *Felice Pantaleo*

17:00

Aula A, Dipartimento di Fisica e Astronomia — 16:35 - 17:50

18:00

Welcome drink

IR-0A, Dipartimento di Fisica e Astronomia — 18:00 - 19:00

Agenda *(Tuesday)*

09:00

Hands-on GPU — *Felice Pantaleo*

Laboratorio C (CLA), Dipartimento di Fisica e Astronomia — 09:00 - 10:45

10:00

Coffee Break

IR-0A, Dipartimento di Fisica e Astronomia — 10:45 - 11:15

11:00

Lecture GPU (part 3) — *Felice Pantaleo*

Laboratorio C (CLA), Dipartimento di Fisica e Astronomia — 11:15 - 13:00

12:00

15:00

Introduction to performance portability with Alpaka (part 1) — *Dr Andrea Bocci*

Aula Magna, Dipartimento di Fisica e Astronomia — 14:30 - 16:15

16:00

Coffee break

IR-0A, Dipartimento di Fisica e Astronomia — 16:15 - 16:45

Introduction to performance portability with Alpaka (part 2) — *Dr Andrea Bocci*

17:00

18:00

Aula Magna, Dipartimento di Fisica e Astronomia — 16:45 - 18:30

Agenda *(Wednesday)*

09:00

Hands-on Alpaka — *Dr Andrea Bocci*

Laboratorio C (CLA), Dipartimento di Fisica e Astronomia — 09:00 - 10:45

10:00

Coffee Break

IR-0A, Dipartimento di Fisica e Astronomia — 10:45 - 11:15

11:00

Hands-on Alpaka — *Dr Andrea Bocci*

Laboratorio C (CLA), Dipartimento di Fisica e Astronomia — 11:15 - 13:00

12:00

15:00

Consolidation (more exercises or specific use cases) — *Dr Andrea Bocci*

Aula A, Dipartimento di Fisica e Astronomia — 14:30 - 16:15

16:00

Coffee break

IR-0A, Dipartimento di Fisica e Astronomia — 16:15 - 16:45

17:00

Consolidation (more exercises or specific use cases) — *Felice Pantaleo*

Aula A, Dipartimento di Fisica e Astronomia — 16:45 - 18:30

18:00

20:00

Social dinner

20:00 - 22:00

21:00

22:00

Agenda *(Thursday)*

09:00 — **Lecture: Hyperparameter optimization with OPTUNA** — *Dr Ümit Sözbilir*
Aula A, Dipartimento di Fisica e Astronomia 09:00 - 11:00

10:00

11:00 — **Coffee break**
Dipartimento di Fisica e Astronomia 11:00 - 11:30

Hands-on: optimization in OPTUNA — *Dr Ümit Sözbilir*
Aula A, Dipartimento di Fisica e Astronomia 11:30 - 13:00

12:00

15:00 — **Consolidation (more exercises or specific use cases)** — *Dr Andrea Bocci*
Laboratorio Informatico (Aula II), Dipartimento di Fisica e Astronomia 14:30 - 16:30

16:00 — **Coffee break**
Dipartimento di Fisica e Astronomia 16:30 - 17:00

17:00 — **Consolidation (more exercises or specific use cases)**
Laboratorio Informatico (Aula II), Dipartimento di Fisica e Astronomia 17:00 - 18:00

18:00

Agenda *(Friday)*

09:00

More consolidation (on specific use cases)

Laboratorio Informatico (Aula II), Dipartimento di Fisica e Astronomia 09:00 - 11:00

10:00

11:00

Break

Dipartimento di Fisica e Astronomia 11:00 - 11:20

Wrap-up and closeout

Laboratorio Informatico (Aula II), Dipartimento di Fisica e Astronomiavia Irnerio 46, 40126 Bologna (BO), Italy 11:20 - 12:00

12:00

GPU resources for the course

- For this course, **six** Virtual Machines (VMs) have been allocated
- Each VM contains an **Nvidia Tesla V100 GPU** board (SXM2-32GB)
- Only people with **valid INFN AAI credentials** can access these VMs:
  - If you already did it, good! *(see next slides)*
  - If you didn't request them, **follow this guide** as soon as possible
    (otherwise, we can't grant you access in time for the hands-on)

A huge thank you to INFN Cloud, for the machine provisioning and support!!

How to access the GPU VMs

- **The following slides** show a **mapping** between your INFN AAI username and the name of the GPU VM.
- The **VMs IPs** are:
  - **gpu-1:** 131.154.99.7
  - **gpu-2:** 131.154.98.219
  - **gpu-3:** 131.154.98.210
  - **gpu-4:** 131.154.99.131
  - **gpu-5:** 131.154.98.61
  - **gpu-6:** 131.154.99.178
- To connect, open a terminal window and run: **ssh username@131.154.XX.YY**

  (*Replace username and IP, the password is the one of the AAI credentials*)

ID	Username AAI	GPU VM
1	abocci	gpu-2
2	apompili	gpu-6
3	auperego	gpu-4
4	battilan	gpu-1
5	fpantaleohpc	gpu-3
6	sbalducci	gpu-5
7	sgennai	gpu-1
8	usozbilir	gpu-5
9	bartosik	gpu-3
10	bonacors	gpu-3
11	capriotl	gpu-6
12	cicchell	gpu-2
13	corchia	gpu-6
14	cruciani	gpu-5
15	emastria	gpu-3
16	espiriti	gpu-4
17	fanfani	gpu-1
18	ffilippi	gpu-5
19	fmei	gpu-6

ID	Username AAI	GPU machine
20	irojas	gpu-2
21	levig	gpu-2
22	manwar	gpu-1
23	mbuonsante	gpu-1
24	mtagliaz	gpu-3
25	neril	gpu-6
26	nrubini	gpu-4
27	nyadav	gpu-4
28		
29		
30		

User guide, FAQ, WiFi connection

- **Wi-Fi credentials:** if you cannot access eduroam or other SSIDs, temporary university credentials (AlmaWifi) are available (ask to the organizers)
- In **this document**, you will find some helpful instructions on how to use the VMs during the course.
  - It will be updated during the week to address **common issues / FAQ**
  - This guide **complements** the specific instructions that the teachers and facilitators will give you separately.

User guide and FAQ

- In **this document**, you will find some helpful instructions on how to use the VMs during the course.
  - In case of common issues and FAQ, it will be updated during the week.
  - This guide **complements** the specific instructions that the teachers and facilitators will give you separately.

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Enjoy the course!