

# LABORATOIRE DE PHYSIQUE III: TP 3

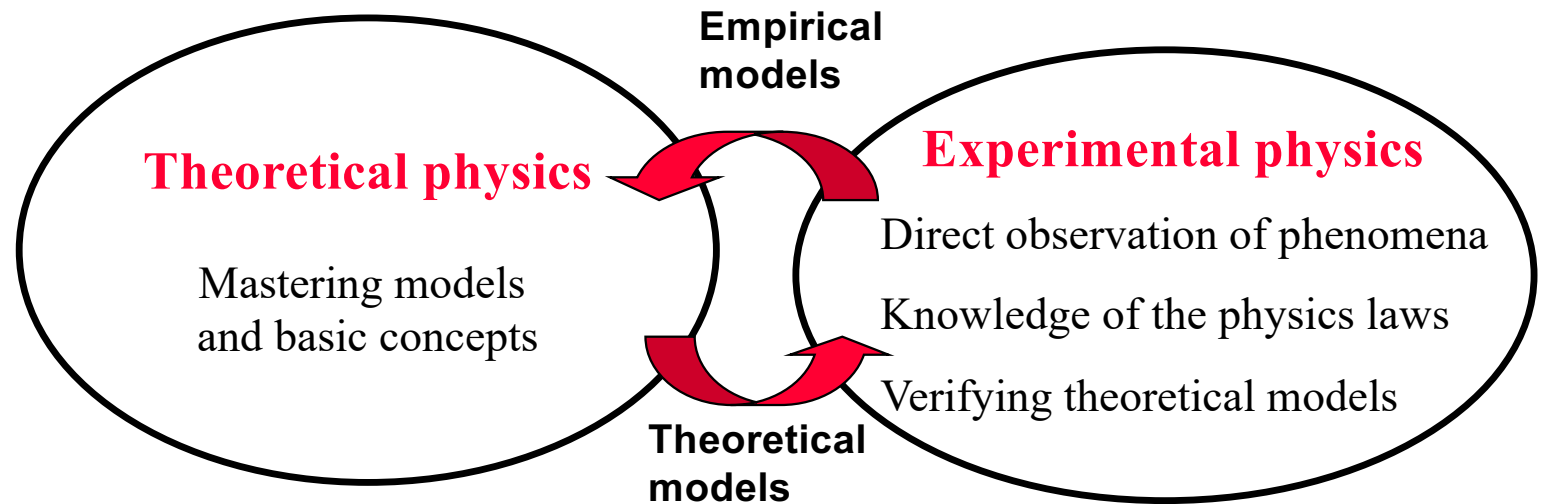
## SEANCE D'INTRODUCTION

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# Advanced Physics Laboratory

*The test of all knowledge is experiment. Experiment is the sole judge of scientific « truth ». But what is the source of knowledge? Where do the laws that are to be tested come from? Experiment, itself, helps to produce these laws, in the sense that it gives us hints.*

Richard Feynman



# Goals of the Physics Laboratory

- ❖ The art of experimentation
  - using the right equipment, building and repairing
  - data acquisition and analysis
- ❖ Mastering physical concepts
- ❖ Communicating results
  - lab notebooks, reports, presentations, posters
- ❖ Developing collaborative skills
- ❖ Developing the sense of initiative and creativity

# Organization

- ❖ Teamwork: 3 students by group
- ❖ 3 TPs per semester (4 weeks each)
- ❖ Fridays 8:15-17h
- ❖ 8 hours of laboratory work
- ❖ Presence is mandatory

# Safety

Respect instructions and regulations!

- ❖ Lasers, cryogenic (N<sub>2</sub> liquid), high voltage, radiation...
- ❖ Drinks and food are forbidden in the laboratories
- ❖ Leave the laboratory clean and ordered

# Introductory notes

- ❖ Get full information before the beginning of TP
  - > Check the web site: Travaux pratiques de physique 3<sup>ème</sup> année
  - > <https://www.epfl.ch/schools/sb/sph/physiquetp/tp3/tp3-exp/>

# Lab notebooks

- ❖ Should enable reproduction of results
- ❖ Chronological record of goals, procedures, material, conditions, data, calculations, thoughts, explanations and results of experiments
- ❖ Free format
- ❖ **Uploaded to Moodle at the end of session**

# Reports

- ❖ Reports (in French or English) must be sent to assistants before starting the new TP  
**and uploaded to Moodle**
- ❖ Feedback: ask the assistant about the status of your report and discuss in detail

# Reports (10 - 12 pages)

Type:  
Scientific  
paper

1) **Introduction** (~ 1 page)

Motivation, make the subject of the report clear, state clearly the aims

2) **Theory / Experimental setup** (~ 2 pages)

3) **Results** (~ 5-6 pages)

Present the obtained results as graphs and/or tables. Number and label each figure or table with captions. Include all experimental conditions.

4) **Discussion** (~ 2 pages)

Compare your results with those obtained by other groups **or data already published in literature**

5) **Conclusion** (~1/2 page)

Summing up, convictions of evidence

# Evaluation

One grade for each TP:  $a + b + c + d$

a) TP preparation (0.5 pt)

- theory, information and data retrieval

b) Laboratory work (2 pt)

- safety, order, punctuality, autonomy, initiative, efficiency

c) Lab notebook (1 pt)

- paper or electronic

d) Report, oral or poster presentation (2.5 p)

Semester grade =  $(TP1 + TP2 + TP3) / 3$

# Evaluation: reports, presentations

- ❖ structure and length
- ❖ scientific vocabulary
- ❖ clear presentation of the results
- ❖ interpretation and discussion of results  
(understanding)

# Presentation of the results

Figures and tables

- ❖ Numbering and citing in the text in order
- ❖ Relevant concise captions
- ❖ Axis labels, scaling, font size, symbol size, legend

Units, scientific notation, rounding

Incertitudes

Data and figures from outside sources are referenced

# Generative AI - LLMs

“EPFL recognizes the potential of generative AI tools to benefit teaching and learning. Like any tool, they have their advantages, but we also need to be aware of their limitations and the major risks they present. We encourage the use of generative AI in education in an informed, responsible and transparent manner.”

"Should students make use of AI in their assignments, they are expected to acknowledge it explicitly and to apply critical thinking (particularly with respect to sources, potential biases, and data sharing). AI should be used responsibly as a tool to support learning, rather than as a substitute for students' own work."

# Generative AI - LLMs

## BENEFITS

- ❖ They can make it easier for students to produce work that is clearly written and well formatted and thus communicates their ideas more clearly
- ❖ They can enable students to produce higher-quality work by acting as a tool for brainstorming and by providing feedback on form and content.

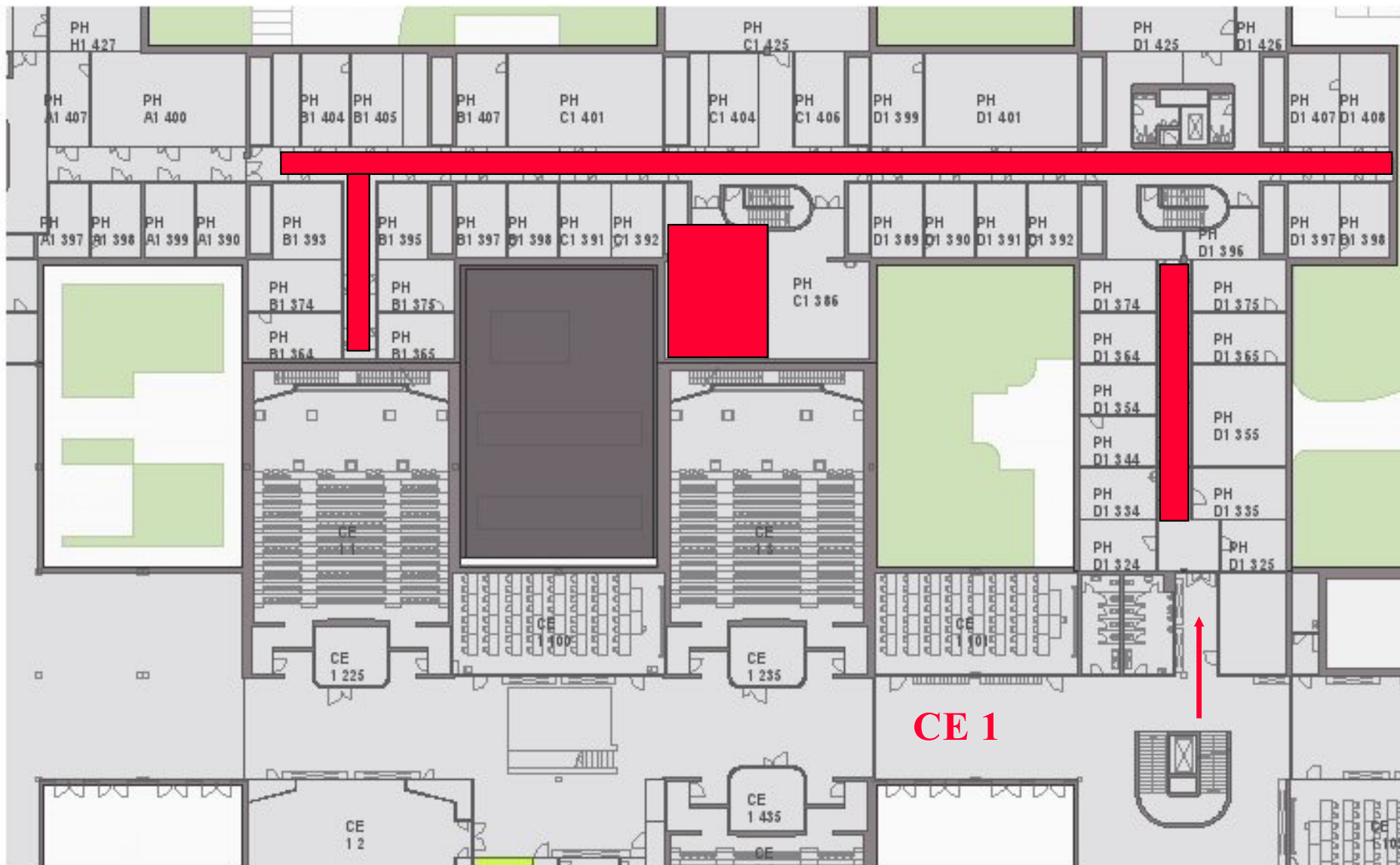
# Generative AI - LLMs

## RISKS

- ❖ Environmental impact
- ❖ Data protection
- ❖ AI can produce inaccurate or biased content
- ❖ When students rely on AI tools to complete exercises or projects, they may bypass the learning process and miss out on developing essential skills.



	<b>Nom</b>	<b>EXPERIENCE</b>	<b>EXPERIENCE</b>
<b>A</b>	ESMER Berna <a href="mailto:berna.esmer@epfl.ch">berna.esmer@epfl.ch</a>	Magnétisme et matériaux magnétiques	Effets Magnéto Optiques
<b>B</b>	ANVARI Fatima <a href="mailto:fatemeh.anvarivind@epfl.ch">fatemeh.anvarivind@epfl.ch</a>	RMN	Résonance de spin électronique (RPE)
<b>C</b>	KUZNETSOV Nikolai <a href="mailto:nikolai.kuznetsov@epfl.ch">nikolai.kuznetsov@epfl.ch</a>	Interférences Optiques	Microscopie à fluorescence
<b>D</b>	DUINA Andrea <a href="mailto:andrea.duina@epfl.ch">andrea.duina@epfl.ch</a>	Chaos déterministe	Effets Quantiques
<b>E</b>	PISANI Federico <a href="mailto:federico.pisani@epfl.ch">federico.pisani@epfl.ch</a>	Supraconductivité I	Supraconductivité II
<b>F</b>	GAAL Benedek <a href="mailto:benedek.gaal@epfl.ch">benedek.gaal@epfl.ch</a>	Confinement optique I	Confinement optique II
<b>G</b>	DEGENEVE Lucas <a href="mailto:lucas.degeneve@epfl.ch">lucas.degeneve@epfl.ch</a>	Nanoindentation	Métallurgie
<b>H</b>	BROWN Benjamin <a href="mailto:benjamin.brown@epfl.ch">benjamin.brown@epfl.ch</a>	Plasma - I	Plasma - II
<b>I</b>	WU Kexin <a href="mailto:kexin.wu@epfl.ch">kexin.wu@epfl.ch</a>	Laser à semi-conducteurs	Détection quantique
<b>J</b>	LIU Yong <a href="mailto:yong.liu@epfl.ch">yong.liu@epfl.ch</a>	Physique couches minces	Analyse thermique
<b>K</b>	PAKARI Oskari <a href="mailto:oskari.pakari@epfl.ch">oskari.pakari@epfl.ch</a>	Flux neutroniques	Spectroscopie $\gamma$ et $n^1_0$
<b>L</b>	NERSON Tristan <a href="mailto:tristan.nerson@epfl.ch">tristan.nerson@epfl.ch</a>	Milieux granulaires	Physique de bulles
<b>M</b>	<a href="mailto:jou.chen@epfl.ch">jou.chen@epfl.ch</a> (4) <a href="mailto:tobias.monnard@epfl.ch">tobias.monnard@epfl.ch</a> (5) <a href="mailto:kimberly.keyser@epfl.ch">kimberly.keyser@epfl.ch</a> (6) <a href="mailto:vasilisa.guliaeva@epfl.ch">vasilisa.guliaeva@epfl.ch</a> (10)	Physique nucléaire Exp4, Exp5, Exp6, Exp10	
<b>N</b>	AHN Chulwoo <a href="mailto:chulwoo.ahn@epfl.ch">chulwoo.ahn@epfl.ch</a>	Spectroscopie optique I	Photoémission interne
<b>O</b>	GRIGAS Aistis <a href="mailto:aistis.grigas@epfl.ch">aistis.grigas@epfl.ch</a>	Microscopie à force Atomique (AFM I)	AFM II
<b>P</b>	TKALCEC VÁJU Iva <a href="mailto:Iva.tkalcec@epfl.ch">Iva.tkalcec@epfl.ch</a>	Frottement Intérieur	
<b>R</b>	BI Wen Hua David <a href="mailto:wen.bi@epfl.ch">wen.bi@epfl.ch</a>	Rayons X	Analyses par DRX
<b>S</b>	DE ARA GARCIA Tamara <a href="mailto:tamara.dearagarcia@epfl.ch">tamara.dearagarcia@epfl.ch</a>	Interactions microondes - matière	Para et Ferroélectricité
<b>T</b>	MARI Daniele <a href="mailto:daniele.mari@epfl.ch">daniele.mari@epfl.ch</a>	Microscopie à force Magnétique (MFM)	
<b>U</b>	CICCARELLO Francesco <a href="mailto:francesco.ciccarello@epfl.ch">francesco.ciccarello@epfl.ch</a>	Intrication quantique	Spectroscopie Raman
<b>V</b>	BREDBERG Markus <a href="mailto:markus.bredberg@epfl.ch">markus.bredberg@epfl.ch</a>	Radiotélescope	
<b>W</b>	GENÇTÜRK Elif <a href="mailto:elif.gencturk@epfl.ch">elif.gencturk@epfl.ch</a>	Behavioral physics	



CE 1

# Disciplinary projects

## Daniele Mari

Tout le semestre de printemps: 8 crédits

Proposition de projet à soumettre au plus tard le 1 décembre

- Motivation scientifique ou technique
- Descriptif du projet: max 1 page
- Objectifs
- Planning sur le semestre, milestones, répartition individuelle des tâches
- Budget
- Supervisor

Proposition par groupe

Evaluation: 1 rapport technique et 1 exposé oral

<https://www.epfl.ch/education/educational-initiatives/discovery-learning-program-2/interdisciplinary-projects/>

# International Physicists' Tournament

Daniele Mari

Jean-Marie Fuerbringer