

# Welcome to CP2023

## International Workshop on the Origin of Matter-Antimatter Asymmetry



# Ecole de physique des Houches



Created in 1951 by the French theoretical physicist Cécile DeWitt-Morette.

She was then a 28 years old postdoc at Princeton, US.

8 weeks summer course in physics for ~30 international students

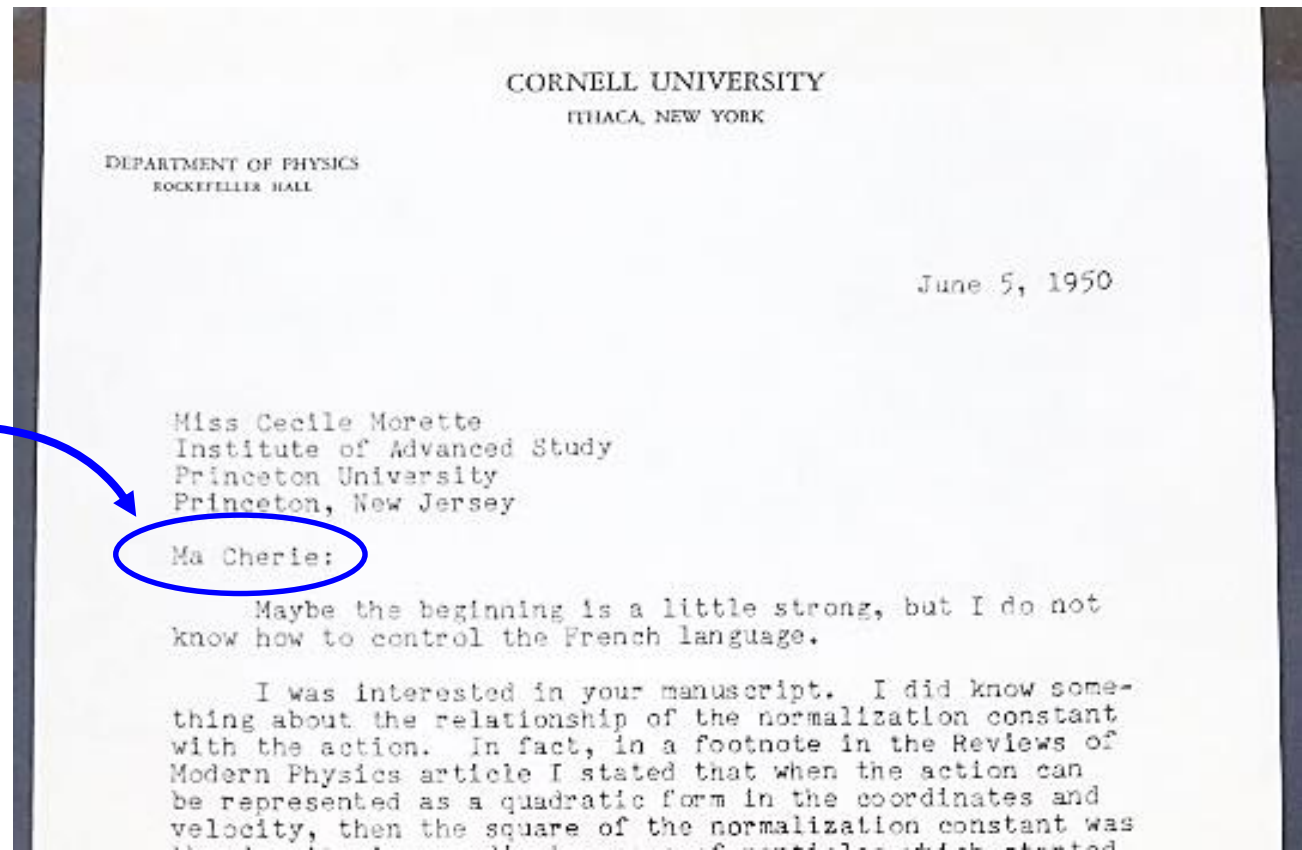


# Cécile DeWitt-Morette



Mathematical physicist, she developed the path integral formalism invented by Richard Feynman

Feynman, faking to ignore the meaning of French in his correspondence with Cécile Morette



# Recollection



Fermi and Von Hove in 1954



Cohen-Tannoudji in 1964



Feynman in 1976

# Famous lectures, early years

1951 – Quantum mechanics  
L. Von Hove

1952 – Time reversal  
W. Pauli

1953 – Quantum theory of solids  
R. Peierls

1954 – Advanced quantum mechanics  
F. Dyson

1955 – Quantum mechanics  
J. Schwinger

1955 – Interaction of a nucleus with at. and mol. fields  
N. Ramsey

1956 – Theory of low temperature physics  
J. Bardeen

1957 – Strange particles  
A. Salam



# History since 1952



Pauli, lecturing on T symmetry in 1952

**1954 – Proofs of the CPT theorem Pauli, Lüders**

**1964 – Discovery of CP violation Cronin, Fitch**

**1967 – Sakharov formulates 3 conditions to generate the BAU**

**1973 – Kobayashi Maskawa theory of SM CPV**

**1985 – Electroweak baryogenesis Kuzmin, Rubakov, Shaposhnikov**

**1986 – Leptogenesis, Fukigita Yanagida**

Since then, the BAU puzzle is a driving question in particle physics, it fuels the interplay between phenomenology and experiments.



# CP2023

## Ongoing and future experimental programs to probe Sakharov conditions

- Collider probes of CPV LHCb, Belle II
- Low energy CPV precision probes EDMs
- Long baseline neutrinos NOVA, T2K, DUNE, HK
- B and L violation  $n\bar{n}$ ,  $0\nu\beta\beta$  decay



Models of  
Baryogenesis/  
Leptogenesis

# Lectures at CP2023

1952 – Time reversal

**W. Pauli**

1955 – Quantum mechanics

**J. Schwinger**

1957 – Strange particles

**A. Salam**

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**2023 – CP violation and Effective Field Theories**

Adam Falkowski, IJCLab Orsay



**2023 – Basics of baryogenesis**

Julia Harz, TUM Munich





# CP2023 - The program

Monday	Tuesday	Wednesday	Thursday	Friday
Welcome	Lecture 1 Falkowski	Lecture 1 Harz	Lecture 2 Harz	<b>LONG BASELINE NEUTRINO OSCILLATIONS</b>
<b>Collider probes overview, LCb, Belle II</b>	<b>PHENO CPV</b>	<b>LONG BASELINE NEUTRINO OSCILLATIONS</b>	<b>THEORY LEPTOGENESIS</b>	
<b>EDMs</b>				
Lunch 12:30-13:30	Lunch 12:30-13:30	Lunch 12:30-13:30	Lunch 12:30-13:30	Lunch 12:00-13:30
<b>EDMs</b>				Bus departure at 13:30
				Bus arrival at Geneva airport at 15:30
<b>Baryon and Lepton number violation</b>	(Starting at 17:00)			
	<b>PHENO CPV</b>	(Starting at 18:00)		
	Poster Session (18:00-19:30)	Lecture 2 Falkowski		
Dinner (19:30)	Dinner (19:30)	Dinner (19:30)	Tartiflette (19:30)	

# Practical information



**Breakfast 7h45 – 8h45**

**Lunch at 12h30** possible to have a picnic instead if you ask the day before

**Dinner at 19h30**

@ session chairs: make sure we are on time!

- Payment of registration fees at the secretariat before Wednesday noon.
- Rooms: we have to leave the rooms before Friday 9h00
- Please set up the posters before tomorrow afternoon
- Internet: Eduroam or wifi code
- Speakers: please upload your pdf presentations on the indico

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# Weather Les Houches



Auvergne-Rhône-Alpes, France, 45.89°N 6.81°E, 1038m asl



Mon Today	Tue Tomorrow	Wed 2-15	Thu 2-16	Fri 2-17	Sat 2-18
10 °C	10 °C	11 °C	10 °C	9 °C	13 °C
1 °C	2 °C	3 °C	3 °C	3 °C	5 °C
↙ 4 km/h	↙ 5 km/h	← 12 km/h	↑ 12 km/h	↘ 12 km/h	← 10 km/h
💧 -	-	-	-	-	-
☀️ 10 h	☀️ 10 h	☀️ 10 h	☀️ 3 h	☀️ 3 h	☀️ 5 h

ask the day before

me!

- Payment of regist
- Rooms: we have t
- Please set up the
- Internet: Eduroam
- Speakers: please

Monday	03 <sup>00</sup>	06 <sup>00</sup>	09 <sup>00</sup>	12 <sup>00</sup>	15 <sup>00</sup>	18 <sup>00</sup>
🌡 Temperature (°C)	1°	1°	3°	8°	10°	6°
🖐 Temperature felt (°C)	-2°	-3°	0°	5°	6°	3°

# Enjoy CP2023



Guillaume Pignol, Stéphanie Rocchia, Mathieu Guigue – 12 Feb 2023