

PHYSICS WITHOUT FRONTIERS: VENEZUELA



PHYSICS REBOOT QUANTUM INFORMATION BOOTCAMP

APR 15 - APR 30 (2022)

Physics Research and Education Bootcamps for Venezuela (**Physics REBoot Venezuela**) is a year long project by **PWF** and **COF Alumni USB**, comprised of a series of **bootcamps** that aims to improve the career-developing conditions of undergraduate and graduate **physics students** in **Venezuela**.

Organising Committee:

Maria Teresa Barrera, *RWTH Aachen University*.

Antonio Figueroa, *RWTH Aachen University*.

Mauricio Gómez Vloria, *Université Paris Saclay (IOGS)*.

Manuel Morgado, *Université de Strasbourg (CESQ)*.

Kevin Ng, *Northeastern University*.

Julián Rey, *Instituto de Física Teórica, Universidad Autónoma de Madrid*.

Anabel Romero Hernandez, *University of Illinois at Urbana-Champaign*.

Karleyda Sandoval, *Oklahoma State University*



The Abdus Salam
**International Centre
for Theoretical Physics**
Physics Without Frontiers



QUANTUM
Episode 3

Quantum Information

Bootcamp

Event Program

(Venezuelan Standard Time GMT -4)

Welcome

15/04/2022

13:20: Welcome by COF Alumni

14:20: Ice-Breakers and socialization

Classes

16/04 - 22/04/2022

16/04 11:00 Masterclass

From 18/04 to 25/04

10:00 to 17:40

Classes on different QI topics with international speakers

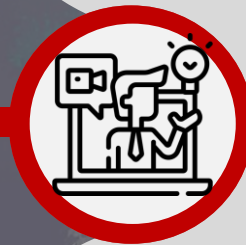
Farewell

30/04/2022

10:00: Masterclass

11:00 Presentations

13:00 Farewell



Co-op Project

23/04 - 30/04/2022

23/04 12:20: Group and topic assignment

25/04 30/04 Project Development

Quantum Information

Bootcamp

Classes Main Blocks

1

Q. Foundations

10:00 to 10:50

Introduction to concepts of Quantum Mechanics.

2

Q. Science & Technology

11:00 to 11:50

Implementation of quantum technologies with different architectures and systems available nowadays, and strong candidates for applications in QI processing.

3

Q. Computing

12:20 to 13:20

Introduction of fundamental concepts of quantum computation and processing from the abstraction of quantum circuits to the control of physical systems.

4

Communications

14:20 to 15:20

Fundamental concepts of quantum communications and quantum networks, from the abstraction of networks encoding to implementation to optical fibers

5

Software resources

15:30 to 16:30

Learning and introducing computational tools used in the quantum information sciences and technologies fields.

6

Special topics

16:40 to 17:30

Ongoing research topics and developments in the field.

Time in Venezuelan Standard Time GMT -4

Classes detailed program

	Time (VET)	Subject	Speaker
Friday 15/04	13:20 – 14:20	Welcome Talk	COF Alumni USB
	14:20 – 15:20	Ice-Breakers	COF Alumni USB
	15:30 – 16:30	Ice-Breakers	COF Alumni USB
Saturday 16/04	11:00 – 12:10	Opening Masterclass	D. Di Vincenzo
	12:20 – 13:20	Resources Training	COF Alumni USB
	13:20 – 14:20	Break, Lunch/Dinner	
	14:20 – 15:20	Mathematics Revision	COF Alumni USB
	15:30 – 16:30	Physics Revision	COF Alumni USB
Monday 18/04	10:00 – 10:50	Review of QM	H. Albrecht
	11:00 – 12:20	Implementation with Photons	R. Gomez
	12:20 – 13:20	Intro to QIP	M. Morgado
	13:20 – 14:20	Break, Lunch/Dinner	
	14:20 – 15:20	Intro to Quantum Communications	E. Castro
	15:30 – 16:30	Python	A. Figueroa
	16:40 – 17:40	Quantum Machine Learning	A. Maldonado
Tuesday 19/04	10:00 – 10:50	Introduction to open quantum systems	H. Albrecht
	11:00 – 12:10	Implementation with Ions	E. Páez
	12:20 – 13:20	From classical logic gates to quantum gates	M. Morgado
	13:20 – 14:20	Break, Lunch/Dinner	
	14:20 – 15:20	Q. Comm. with optical fibers & free space	E. Castro
	15:30 – 16:30	Qiskit 1	M.Gomez-Viloria
	16:40 – 17:40	Dynamical Casimir	F. Nori
Wednesday 20/04	10:00 – 10:50	EPR paradox and Bell experiment	H. Albrecht
	11:00 – 12:10	Implementation with Superconductors	V. Rodriguez-Toro
	12:20 – 13:20	Quantum Careers	QUIRECA
	13:20 – 14:20	Break, Lunch/Dinner	
	14:20 – 15:20	Quantum networks encoding	E. Castro
	15:30 – 16:30	QuTiP	S. Cross
	16:40 – 17:40	AQIPT	M. Morgado

Classes detailed program

	Time (VET)	Subject	Speaker
Thursday 21/04	10:00 – 10:50	Quantum correlations	H. Albrecht
	11:00 – 12:10	Implementation with Atoms	S. Whitlock
	12:20 – 13:20	Quantum circuits and implementations	M. Morgado
	13:20 – 14:20	Break, Lunch/Dinner	
	14:20 – 15:20	Quantum internet	E. Castro
	15:30 – 16:30	Quantum algorithms and control	M. Morgado
	16:40 – 17:40	TBA	
	Friday 22/04	10:00 – 10:50	Quantum optics
10:45 – 12:15		Implementation with Semiconductors	H. Bluhm
11:00 – 12:10		Implementation with Semiconductors	Y-M. Niquet
13:20 – 14:20		Break, Lunch/Dinner	
14:20 – 15:20		Quantum cryptography	E. Castro
15:30 – 16:30		Quantum error correction	M. Morgado
16:40 – 17:40		QNE + Qiskit 2	M. Morgado
Saturday 23/04	10:00 – 10:50	Lab Tours	CESQ
	11:00 – 12:10	Tutorials	COF Alumni USB
	12:20 – 13:20	Tutorials	COF Alumni USB
	13:20 – 14:20	Break, Lunch/Dinner	
	14:20 – 15:20	Groups Assignment	COF Alumni USB
	15:30 – 16:30	Groups Assignment	COF Alumni USB
Monday 25/04	10:00 – 10:50	Q and A Session	F. Nori
	11:00 – 12:10	Co-op project development	
	12:20 – 13:20	Co-op project development	
	13:20 – 14:20	Break, Lunch/Dinner	
	14:20 – 15:20	Co-op project development	
	15:30 – 16:30	Co-op project development	
Saturday 30/04	10:00 – 10:50	Closing Talk	C. Ladera
	11:00 – 12:10	Presentations	
	12:20 – 13:20	Presentations	
	13:20 – 14:20	Break, Lunch/Dinner	
	14:20 – 15:20	Presentations	
	15:30 – 16:30	Farewell	COF Alumni USB