[27/02/2026]	Efficient verification of quantum computing architectures with bosons
	D5.13 – THEORETICAL WORKSHOP Version 0.1 – Final PUBLIC
European Innovation Council	This project has received funding from the European Union's Horizon Europe Framework Programme under Grant Agreement No.101114899

Theoretical Workshop

Acronym	VeriQuB
Project Name:	Efficient verification of Quantum computing architectures with Bosons
Grant Agreement No:	101114899
Start Date:	01/09/2023
End Date:	31/08/2027
Contributing WP	WP5 - Project management, communication, dissemination and exploitation
WP Leader:	INRIA
Deliverable identifier	5.13
Contractual Delivery Date: 28/02/2026	Actual Delivery Date: 27/02/2026
Nature: Report	Version: 0.1 Final
Dissemination level	PU

Revision History

Version	Created/Modifier	Comments
0.0	09/02/2026	First Draft from INL team (Leonardo Novo, Rui Soares Barbosa)
0.1	27/02/2026	Review by INRIA team (Ulysse Chabaud, Giulia Petrarulo)

TABLE OF CONTENTS

Publishable Summary

INL organized a workshop between the 21st and 23rd January 2026. The workshop gathered over 30 participants from all partners of the project and had one day dedicated to experimental talks and two days dedicated to theory talks. The afternoons were dedicated to discussions among project partners with the aim of advancing existing collaborations within the consortium and integrating the new partner INL who joined the project via the EU Hop-on facility.

1| WORKSHOP PROGRAM & SCOPE

INL organized a workshop between the 21st and 23rd January 2026 following the yearly VeriQuB Consortium Meeting, which also took place at the INL premises on the 19th and 20th January. The workshop involved all the partners of the project, gathering over 30 participants.

The workshop was designed to have talks in the morning and a significant time for discussions in the afternoon. The aim was to advance ongoing collaborations within the consortium but also to integrate the new partner INL, which successfully joined the project via the WIDERA Hop-on Facility call (Grant Agreement amendment approved in December 2025, integration of new partner in the project consortium since April 2025).

The detailed program can be found below in Sec. 1.1. While the first day was imagined to allow scientific discussions between experimental and theory researchers involved in the project, the following days were focused on the theoretical aspects related to the verification of quantum speed-up. Talks from the experimental groups from Sorbonne University and Chalmers University opened the workshop presenting recent progress on the experimental platforms of these two groups and highlighting the experimental capabilities that can be used for verification, resource characterization and computational applications. The afternoon programme was organised into parallel breakout sessions, providing a focused setting for small groups of researchers to share knowledge, strengthen interdisciplinary dialogue, and promote cross-fertilisation of expertise. The day ended with a well-attended poster session, where young researchers from consortium institutions could present the work performed so far.

The following two days were characterised by two theory talks from INL researchers Marco Robbio and Leonardo Novo, and one theory talk from young PhD students and postdoctoral researchers of each of the other VeriQuB partners: Rui Wang (Chalmers University), Rivu Gupta (UNIMI), Antoine Debray (Sorbonne University/CNRS), Zacharie Van Herstraeten (INRIA). The topics ranged from recent work on quasiprobability distributions, characterization of non-Gaussian states using capabilities of superconducting devices, computational applications of linear-optical circuits and validation and

complexity of different types of quantum computational advantage proposals using bosonic systems.

On the last day, Branko Kolaric from the ARTEMIS project could attend the theory discussions, in an attempt to improve joint collaborations and synergies among projects belonging to the Alternative Quantum Information Processing, Communication, and Sensing (AQIPCS) Portfolio.

1.1 Workshop program

Workshop for experimental and theory researchers

Dates: Wednesday January 21, 2026
Venue: INL - International Iberian Nanotechnology Laboratory, Av. Mte. José Veiga s/n, 4715-330 Braga, Portugal

Day 3 (Wednesday January 21, 2026) Meeting Room: Auditorium				
From	**To**	**Topic**	**Speaker**	**Institution**
9h30	10h30	Quantum optics experiments	Valentina Parigi	Sorbonne Université
10h30	*11h00*	*Coffee break*		
11h00	12h00	Quantum superconducting experiments	Axel Eriksson, Lukas Splitthoff, Zheshu Xie (Nora)	Chalmers University
12h00	*13h30*	*Lunch break*		
13h30	15h00	Parallel breakout discussions on other topics 1. Breakout discussions (Conference Room) 2. Breakout discussions (Vision Room) 3. Breakout discussions (Auditorium) 4. Breakout discussions (Lobby)	*All partners - Self-organised*	
15h00	15h30	*Coffee break*		
15h30	17h00	Parallel breakout discussions on other topics	*All partners - Self-organised*	

1. Breakout discussions (Conference Room)
2. Breakout discussions (Vision Room)
3. Breakout discussions (Auditorium)
4. Breakout discussions (Lobby)

17h00	19h00	Poster session and reception (Lobby)

Theory Workshop

Dates: Thursday January 22 – Friday January 23, 2026
Venue: INL - International Iberian Nanotechnology Laboratory, Av. Mte. José Veiga s/n, 4715-330 Braga, Portugal

Day 4 (Thursday January 22, 2026)
Meeting Room: Auditorium

From	To	Topic	Speaker	Institution
9h30	10h15	Quantum theory presentation	Leonardo Novo	INL
10h15	*10h45*	*Coffee break*		
10h45	11h30	Quantum theory presentation	Rui Wang	Chalmers University
11h30	12h15	Quantum theory presentation	Rivu Gupta	UNIMI
12h15	*13h45*	*Lunch break*		
13h45	15h15	Quantum theory discussion 1. Breakout discussions (Vision Room) 2. Breakout discussions (Auditorium) 3. Breakout discussions (Lobby) 4. Breakout discussions (Erges Room)	*All partners – Self-organised*	
15h15	15h45	*Coffee break*		
15h45	17h15	Quantum theory discussion 1. Breakout discussions (Vision Room) 2. Breakout discussions (Auditorium) 3. Breakout discussions (Lobby) 4. Breakout discussions (Erges Room)	*All partners – Self-organised*	

Day 5 (Friday January 23, 2026) Meeting Room: Auditorium				
From	**To**	**Topic**	**Speaker**	**Institution**
9h15	10h00	Quantum theory presentation	Antoine Debray	Sorbonne Université/CNRS
10h00	*10h30*	*Coffee break*		
10h30	11h15	Quantum theory presentation	Marco Robbio	INL
11h15	12h00	Quantum theory presentation	Zacharie Van Herstraeten	INRIA
12h00	*13h30*	*Lunch break*		
13h30	15h00	Quantum theory discussion 1. Breakout discussions (Conference Room) 2. Breakout discussions (Vision Room) 3. Breakout discussions (Auditorium) 4. Breakout discussions (Lobby)	*All partners*	
15h00	15h30	*Coffee break*		
15h30	17h00	Quantum theory discussion 1. Breakout discussions (Conference Room) 2. Breakout discussions (Vision Room) 3. Breakout discussions (Auditorium) 4. Breakout discussions (Lobby)	*All partners*	
17h00	17h10	Concluding remarks	Ulysse Chabaud Leonardo Novo	INRIA INL

1.1 Workshop list of participants

Name	Affiliation
Branko Kolaric	AQIPCS Portfolio (representative of ARTEMIS project)

Alex Maltesson	Chalmers University of Technology
Axel Eriksson	Chalmers University of Technology
Eduardo Bardales España	Chalmers University of Technology
Kiwmann Hwang	Chalmers University of Technology
Lukas Splitthoff	Chalmers University of Technology
Rui Wang	Chalmers University of Technology
Zheshu Xie	Chalmers University of Technology
Florian Cottier	INRIA
Francesco Arzani	INRIA
Jack Davis	INRIA
Luca Francesco D'Alessandro	INRIA
Ulysse Chabaud	INRIA
Varun Upreti	INRIA
Zacharie Van Herstraeten	INRIA
Antonio Ruiz Molero	International Iberian Nanotechnology Laboratory
Benoit Seron	International Iberian Nanotechnology Laboratory
Carolina Sobral	International Iberian Nanotechnology Laboratory
David Gunn	International Iberian Nanotechnology Laboratory
Diogo Manuel Pereira Gomes	International Iberian Nanotechnology Laboratory
Leonardo Novo	International Iberian Nanotechnology Laboratory
Lorenzo Catani	International Iberian Nanotechnology Laboratory
Mafalda Pinto Couto	International Iberian Nanotechnology Laboratory
Marco Robbio	International Iberian Nanotechnology Laboratory
Rui Soares Barbosa	International Iberian Nanotechnology Laboratory
Sara Franco	International Iberian Nanotechnology Laboratory
Som kanjilal	International Iberian Nanotechnology Laboratory
Angelos Bampounis	University of Minho / International Iberian Nanotechnology Laboratory (INL)
Eduardo Araújo	University of Minho / International Iberian Nanotechnology Laboratory (INL)
Antoine Debray	Sorbonne Université - Laboratoire Kastler Brossel
Massimo Frigerio	Sorbonne Université - Laboratoire Kastler Brossel
Mattia Walschaers	Sorbonne Université - Laboratoire Kastler Brossel
Nicolas Treps	Sorbonne Université - Laboratoire Kastler Brossel
Valentina Parigi	Sorbonne Université - Laboratoire Kastler Brossel
Ernesto Galvão	Universidade Federal Fluminense
Alessandro Ferraro	Università degli Studi di Milano
Matteo Bina	Università degli Studi di Milano
Niccolò Laurora	Università degli Studi di Milano
Rivu Gupta	Università degli Studi di Milano

2| OUTCOMES

The workshop was highly successful and achieved its main goals of updating the different project partners of recent results from the consortium, advancing existing collaborations and integrating INL as a new project partner. Follow-up actions will include frequent online discussions between project members and programming of research visits.

Eighteen PhD students and young researchers from Chalmers University, the International Iberian Nanotechnology Laboratory, INRIA and the University of Milan also had the opportunity to present a scientific poster on their research work in the framework of VeriQuB.

FIGURE 1 PARTICIPANTS TO THE MEETINGS IN BRAGA, PORTUGAL