

QC4HEP Working Group Annual Meeting

Report of Contributions

Contribution ID: 1

Type: **not specified**

Welcome

Friday 24 January 2025 09:00 (5 minutes)

Presenter: Dr VALLECORSA, Sofia (CERN)

Contribution ID: 2

Type: **not specified**

State-of-the-art of the field (HEP)

Friday 24 January 2025 09:05 (30 minutes)

Contribution ID: 3

Type: **not specified**

State-of-the-art of the HW

Friday 24 January 2025 10:35 (15 minutes)

Contribution ID: 4

Type: **not specified**

Highlights 1 TH

Friday 24 January 2025 09:35 (5 minutes)

Contribution ID: 5

Type: **not specified**

Highlights 2 TH

Friday 24 January 2025 09:40 (5 minutes)

Contribution ID: 6

Type: **not specified**

Highlights 3 TH

Friday 24 January 2025 09:45 (5 minutes)

Contribution ID: 7

Type: **not specified**

Highlights 4 TH

Friday 24 January 2025 09:50 (5 minutes)

Contribution ID: 8

Type: **not specified**

Discussion TH

Friday 24 January 2025 09:55 (10 minutes)

Contribution ID: 9

Type: **not specified**

Highlights 1 EXP

Friday 24 January 2025 10:05 (5 minutes)

Contribution ID: **10**

Type: **not specified**

Highlights 2 EXP

Friday 24 January 2025 10:10 (5 minutes)

Contribution ID: **11**

Type: **not specified**

Highlights 3 EXP

Friday 24 January 2025 10:15 (5 minutes)

Contribution ID: **12**

Type: **not specified**

Highlights 4 EXP

Friday 24 January 2025 10:20 (5 minutes)

Contribution ID: **13**

Type: **not specified**

Discussion EXP

Friday 24 January 2025 10:25 (10 minutes)

Contribution ID: 14

Type: **not specified**

Challenges: round table with a moderator - Topic: what are the challenges and how to overcome them in the next years

Friday 24 January 2025 11:15 (1h 15m)

Theory: Karl J. & Martin S. & Jad A. & Alessandro R.;
Experiments: Sofia V., Michele G., Andrea D.)

Contribution ID: 15

Type: **not specified**

General assembly (all together)

Friday 24 January 2025 17:00 (1 hour)

- Organization: future virtual and in-person meetings (chairperson: SteerCo)
- Identify needs (enablement required, ...)
- Conduct guidelines (enrolment process, publication policy ...) (chairperson: Ivano)
- Summary of the discussions and outlook (chairperson: SteerCo)

Contribution ID: 16

Type: **not specified**

Parallel sessions: Theory

Friday 24 January 2025 14:00 (2h 30m)

Potential topics to discuss:

- o Optimization: static calculations (phase transition) (chairperson: Name)

Topic: Beyond VQE(?); Martin's "scaling" ansatz; Quantum subspace expansion (Laurin, Julian)

- o Dynamics (chairperson: Stefan K. and Jad H.)

Topic: Scattering: how large can we scale? Can we reach utility scale?

- o What else than Trotter? QDRIFT inspired ansatz, (chairperson: Alessandro R.).

- o Scaling from 1D+1 to 2D+1 and possibly 3D+1 (HW dependences) –near-term vs fault-tolerant (what kind of chip topology will be needed?) (chairperson: Uwe W. and Karl J. and Arianna C.)

- o Possible new research directions (all). Consolidate and/or start working teams working around selected topics.

Contribution ID: 17

Type: **not specified**

Parallel sessions: Experiments

Friday 24 January 2025 14:00 (2h 30m)

Some potential topics for discussion:

- o Parallelization of quantum classical workflow (chairperson: Andrea D.)
- o (Large) data encoding and compression schemes (such as PCA) that can keep quantum correlation (chairperson: Miriam)
- o Quantum Monte Carlo generators (chairperson: Vincent P.)
- o QAOA (chairperson: Andrea)
- o QML ((chairperson: Koji)
- o Quantum generative models (can we make use of quantum data) (chairperson: Vincent C.)
- o Role of quantum sensing (chairperson: Yacine)

Possible new research directions (all). Consolidate and/or start working teams working around selected topics.