

Quantum Observables for Collider Physics

Report of Contributions

Contribution ID: 1

Type: **not specified**

Welcome by the organisers

Monday, 6 November 2023 14:00 (5 minutes)

Contribution ID: 2

Type: **not specified**

Highlight Talk: Quantum algorithms for HEP theory and phenomenology

Tuesday, 7 November 2023 17:30 (1 hour)

Presenter: SPANNOWKSY, Michael (University of Durham)

Contribution ID: 3

Type: **not specified**

Highlight Talk: Quantum Machine Learning for HEP

Thursday, 9 November 2023 17:30 (1 hour)

Presenter: VALLECORSA, Sofia (CERN)

Contribution ID: 4

Type: **not specified**

Highlight Talk: Quantum algorithms simulation and hardware control for HEP

Wednesday, 8 November 2023 17:30 (1 hour)

Presenter: CARRAZZA, Stefano (Istituto Nazionale di Fisica Nucleare)

Contribution ID: 5

Type: **not specified**

Quantum Information with Top Quarks

Monday, 6 November 2023 14:35 (45 minutes)

Presenter: MUÑOZ DE NOVA, Juan Ramón (Universidad Complutense de Madrid)

Session Classification: Keynote talks

Contribution ID: 6

Type: **not specified**

Quantum Information with Electroweak and Higgs Bosons

Monday, 6 November 2023 15:20 (45 minutes)

Presenter: BARR, Alan

Session Classification: Keynote talks

Contribution ID: 7

Type: **not specified**

Loopholes for Bell-Inequalities: what about colliders?

Monday, 6 November 2023 16:30 (35 minutes)

Presenter: FABBRICHESI, Marco (Istituto Nazionale di Fisica Nucleare)

Session Classification: Sessions

Contribution ID: 8

Type: **not specified**

Entanglement suppression, enhanced symmetries and SM-like Higgs

Monday, 6 November 2023 17:05 (35 minutes)

Presenter: LOW, Ian

Session Classification: Sessions

Contribution ID: 9

Type: **not specified**

Probing the limits of quantum theory with quantum information at subnuclear scales

Monday, 6 November 2023 17:40 (35 minutes)

Presenter: ECKSTEIN, Michal

Session Classification: Sessions

Contribution ID: **10**

Type: **not specified**

TBA

Session Classification: Sessions

Contribution ID: 11

Type: **not specified**

Spin correlation and entanglement with the ATLAS experiment

Tuesday, 7 November 2023 09:30 (45 minutes)

Presenter: HOWARTH, James William

Session Classification: Sessions

Contribution ID: 12

Type: **not specified**

TBA

Session Classification: Sessions

Contribution ID: 13

Type: **not specified**

When the Machine Chimes the Bell: Entanglement and Bell Inequalities with Boosted tt

Tuesday, 7 November 2023 14:00 (30 minutes)

Presenter: GONÇALVES, Dorival

Session Classification: Sessions

Contribution ID: 14

Type: **not specified**

Quantum SMEFT tomography: top quark pair production at the LHC

Tuesday, 7 November 2023 14:30 (30 minutes)

Presenter: MANTANI, Luca (DAMTP, University of Cambridge)

Session Classification: Sessions

Contribution ID: 15

Type: **not specified**

Quantum entanglement and top spin correlations in SMEFT at higher orders

Tuesday, 7 November 2023 15:00 (30 minutes)

Presenter: SEVERI, Claudio (University of Manchester)

Session Classification: Sessions

Contribution ID: 16

Type: **not specified**

Isolating semi-leptonic $H \rightarrow WW^*$ decays for Bell inequality tests

Wednesday, 8 November 2023 10:45 (30 minutes)

Presenter: MAURIN, Theo

Session Classification: Sessions

Contribution ID: 17

Type: **not specified**

Testing entanglement and Bell inequalities in $H \rightarrow ZZ$

Wednesday, 8 November 2023 11:15 (30 minutes)

Presenter: MORENO, Jesús

Session Classification: Sessions

Contribution ID: **18**

Type: **not specified**

Exploring Bell inequalities and quantum entanglement in vector boson scattering

Wednesday, 8 November 2023 11:45 (30 minutes)

Presenter: MORALES, R. A.

Session Classification: Sessions

Contribution ID: 19

Type: **not specified**

Entanglement and Bell inequalities violation in $H \rightarrow ZZ$ with anomalous coupling

Wednesday, 8 November 2023 14:00 (30 minutes)

Presenter: BERNAL GONZÁLEZ, Alexander (IFT UAM-CSIC)

Session Classification: Sessions

Contribution ID: 20

Type: **not specified**

Stringent bounds on HWW and HZZ anomalous couplings with quantum tomography at the LHC

Wednesday, 8 November 2023 14:30 (30 minutes)

Presenter: MARZOLA, Luca (Keemilise ja bioloogilise füüsika instituut)

Session Classification: Sessions

Contribution ID: 21

Type: **not specified**

Probing new physics through entanglement in diboson production

Wednesday, 8 November 2023 15:00 (30 minutes)

Presenter: MADGE, Eric

Session Classification: Sessions

Contribution ID: 22

Type: **not specified**

Quantum information and CP measurement in $H \rightarrow \tau^+ \tau^-$ at future lepton colliders

Thursday, 9 November 2023 09:00 (30 minutes)

Presenters: ALTAKACH, Mohammad; LAMBA, Priyanka

Session Classification: Sessions

Contribution ID: 23

Type: **not specified**

Entanglement and entropy in multipartite systems: a useful approach

Thursday, 9 November 2023 09:30 (30 minutes)

Presenter: CASAS, J. A.

Session Classification: Sessions

Contribution ID: 24

Type: **not specified**

Three-body Entanglement in Particle Decays

Thursday, 9 November 2023 10:00 (30 minutes)

Presenter: SAKURAI, Kazuki

Session Classification: Sessions

Contribution ID: 25

Type: **not specified**

Searches for Quantum Decoherence at Belle and Belle II

Thursday, 9 November 2023 14:00 (45 minutes)

Presenter: MOSER, Hans-Guenther

Session Classification: Sessions

Contribution ID: 26

Type: **not specified**

Violation of Bell inequalities with taus at Belle II

Thursday, 9 November 2023 14:45 (30 minutes)

Presenter: VEELKEN, Christian

Session Classification: Sessions

Contribution ID: 27

Type: **not specified**

Bell inequality is violated in $B^0 \rightarrow J/\psi K^*(892)^0$ decays

Thursday, 9 November 2023 15:15 (30 minutes)

Presenter: GABRIELLI, Emidio

Session Classification: Sessions

Contribution ID: 28

Type: **not specified**

Top-Antitop Reconstruction

Friday, 10 November 2023 09:00 (30 minutes)

Presenter: RAVINA, Baptiste

Session Classification: Sessions

Contribution ID: 29

Type: **not specified**

Unfolding Methods in Particle Physics for Quantum Information Observables

Friday, 10 November 2023 09:30 (30 minutes)

Presenter: PINAMONTI, Michele (Istituto Nazionale di Fisica Nucleare)

Session Classification: Sessions

Contribution ID: **30**

Type: **not specified**

Challenges in modelling ttbar spin correlations

Friday, 10 November 2023 10:00 (30 minutes)

Presenter: VRYONIDOU, Eleni

Session Classification: Sessions

Contribution ID: 31

Type: **not specified**

What's next in Top and Diboson?

Friday, 10 November 2023 11:45 (45 minutes)

Presenter: AGUILAR SAAVEDRA, Juan Antonio

Session Classification: Final

Contribution ID: 32

Type: **not specified**

Experimental perspective on the future of quantum information in collider physics

Friday, 10 November 2023 11:00 (45 minutes)

Presenter: JUNG, Andy (Purdue University)

Session Classification: Final

Contribution ID: 33

Type: **not specified**

Theoretical and Experimental Introduction

Monday, 6 November 2023 14:05 (30 minutes)

Presenters: MALTONI, Fabio (Istituto Nazionale di Fisica Nucleare); VOS, Marcel (IFIC - centro mixto U. Valencia/CSIC, Valencia, Spain)

Session Classification: Theoretical and Experimental Introduction