

Foundational tests of Quantum Mechanics at the LHC

20-22 March 2023, Oxford

<https://indico.cern.ch/e/quantumfoundations>

Monday 20th March afternoon (3h)

Why do we care about violating Bell Inequalities - Questions and Controversies

Christopher Timpson

Entanglement and indistinguishability

Vlatko Vedral

Quantum state tomography and applications in weak decays

Alan Barr

Quantum tomography of diboson systems at colliders: entanglement, Bell violation and new physics constraints

Emidio Gabrielli

Tuesday 21st March am (3h)

Quantum Tops: Entanglement, Bell Inequality, Discord and Steering with Top-Quarks

Yoav Afik

Improved tests of entanglement and Bell inequalities with LHC tops

Alberto Casas

Entanglement measurements at ATLAS in t-tbar

Ethan Simpson

Towards testing beyond-quantum theories in particle physics

Michal Eckstein

PANEL SESSION: *Loopholes and interpretations: What would these measurements imply?*

Panellists: Rachel Ashby Pickering, Paweł Horodecki, Juan Ramón Muñoz de Nova, Chris Timpson

Tuesday 21st March pm (3h)

State-Channel Duality applied to Particle Physics

Clelia Altomote

Bell violation by relativistic particles

Paweł Caban

Quantum entanglement and top spin correlations in Standard Model effective field theories

Claudio Severi

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

Kazuki Sakurai

Wednesday 22nd March am (3h)

Entanglement and Bell inequalities in $H \rightarrow WW$, $H \rightarrow ZZ$

Alexander Bernal

Accessing entanglement and suppressing background in semileptonic $H \rightarrow WW$ events

Theo Maurin

Quantum entanglement in $H \rightarrow ZZ$ leptonic decay channels

Martina Javurkova

Towards quantum measurements at CMS

Andrew Wildridge

PANEL SESSION: *Making it happen: steps needed for real experimental measurements*

Federica Fabbri, Jay Howarth, Martina Javurkova, Andrew Wildridge

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Information for speakers

Timing

All talks are scheduled as 25'+5' in order to allow plenty of time for panel sessions on topics of general interest and also for informal discussions

Content

Speakers should assume that they need not reproduce introductory material, and that they shouldn't duplicate material in other talks

Presentations

Each speaker has been provided with an individual slot in the online indico agenda:

<https://indico.cern.ch/e/quantumfoundations>

If you click on your speaker slot and then on three lines (menu) to "View Contribution Details" you should be able use the pencil to "Edit Materials" and upload slides. In case of problems uploading you can use [this link](#) to email your slides to the organisers.

Your final version of any slides must be uploaded or sent **before 8am** for morning sessions; for afternoon sessions they should be uploaded **before midday**.

(These versions will be downloaded to the conference computer and checked for compatibility etc.)

Version of 17th March 2023