Quantum Observables for Collider Physics 2026

A broad summary

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Top LHC France 2026

LPNHE

Tuesday 26th May 2026

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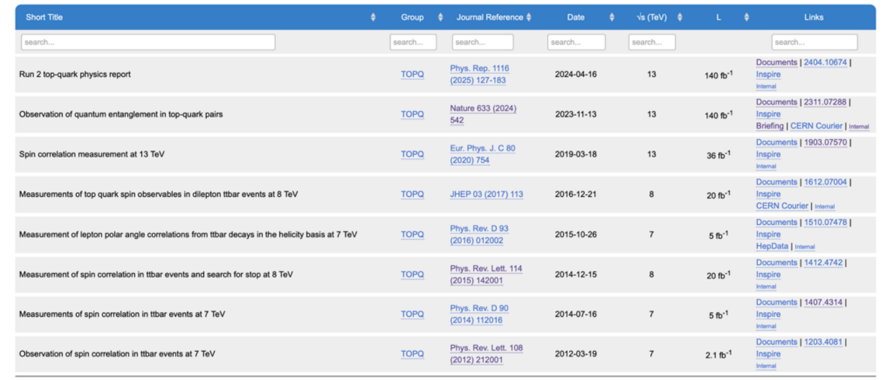
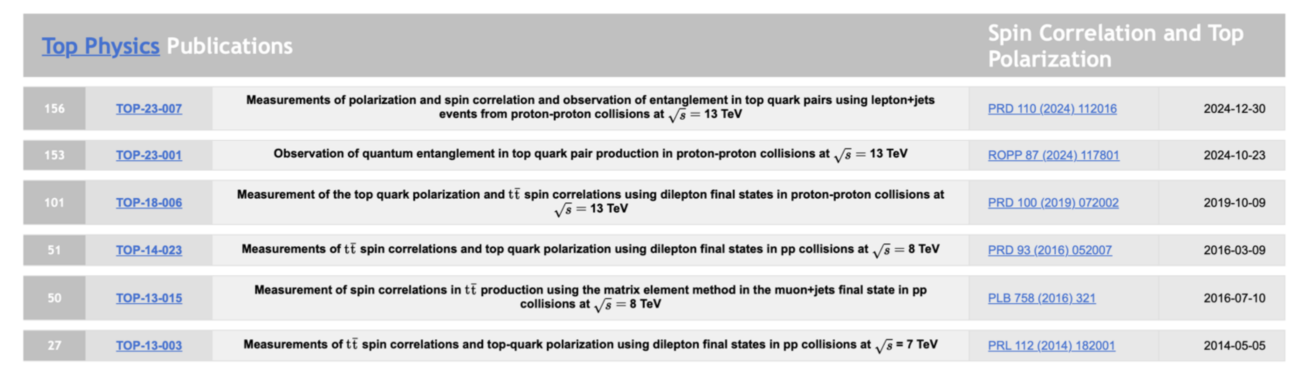


Short Title	Group	Journal Reference	Date	√s (TeV)	L	Links
search...	search...	search...	search...	search...		search...
Run 2 top-quark physics report	TOPQ	Phys. Rep. 1116 (2025) 127-183	2024-04-16	13	140 fb^{-1}	Documents | 2404.10674 | Inspire Internal
Observation of quantum entanglement in top-quark pairs	TOPQ	Nature 633 (2024) 542	2023-11-13	13	140 fb^{-1}	Documents | 2311.07288 | Inspire Briefing | CERN Courier | Internal
Spin correlation measurement at 13 TeV	TOPQ	Eur. Phys. J. C 80 (2020) 754	2019-03-18	13	36 fb^{-1}	Documents | 1903.07570 | Inspire Internal
Measurements of top quark spin observables in dilepton ttbar events at 8 TeV	TOPQ	JHEP 03 (2017) 113	2016-12-21	8	20 fb^{-1}	Documents | 1612.07004 | Inspire CERN Courier | Internal
Measurement of lepton polar angle correlations from ttbar decays in the helicity basis at 7 TeV	TOPQ	Phys. Rev. D 93 (2016) 012002	2015-10-26	7	5 fb^{-1}	Documents | 1510.07478 | Inspire HepData | Internal
Measurement of spin correlation in ttbar events and search for stop at 8 TeV	TOPQ	Phys. Rev. Lett. 114 (2015) 142001	2014-12-15	8	20 fb^{-1}	Documents | 1412.4742 | Inspire Internal
Measurements of spin correlation in ttbar events at 7 TeV	TOPQ	Phys. Rev. D 90 (2014) 112016	2014-07-16	7	5 fb^{-1}	Documents | 1407.4314 | Inspire Internal
Observation of spin correlation in ttbar events at 7 TeV	TOPQ	Phys. Rev. Lett. 108 (2012) 212001	2012-03-19	7	2.1 fb^{-1}	Documents | 1203.4081 | Inspire Internal



Top Physics Publications

Spin Correlation and Top Polarization

156	TOP-23-007	Measurements of polarization and spin correlation and observation of entanglement in top quark pairs using lepton+jets events from proton-proton collisions at $\sqrt{s} = 13$ TeV	PRD 110 (2024) 112016	2024-12-30
153	TOP-23-001	Observation of quantum entanglement in top quark pair production in proton-proton collisions at $\sqrt{s} = 13$ TeV	ROPP 87 (2024) 117801	2024-10-23
101	TOP-18-006	Measurement of the top quark polarization and $t\bar{t}$ spin correlations using dilepton final states in proton-proton collisions at $\sqrt{s} = 13$ TeV	PRD 100 (2019) 072002	2019-10-09
51	TOP-14-023	Measurements of $t\bar{t}$ spin correlations and top quark polarization using dilepton final states in pp collisions at $\sqrt{s} = 8$ TeV	PRD 93 (2016) 052007	2016-03-09
50	TOP-13-015	Measurement of spin correlations in $t\bar{t}$ production using the matrix element method in the muon+jets final state in pp collisions at $\sqrt{s} = 8$ TeV	PLB 758 (2016) 321	2016-07-10
27	TOP-13-003	Measurements of $t\bar{t}$ spin correlations and top-quark polarization using dilepton final states in pp collisions at $\sqrt{s}$ = 7 TeV	PRL 112 (2014) 182001	2014-05-05

Spin correlation measurements in $t\bar{t}$ have been performed for many years

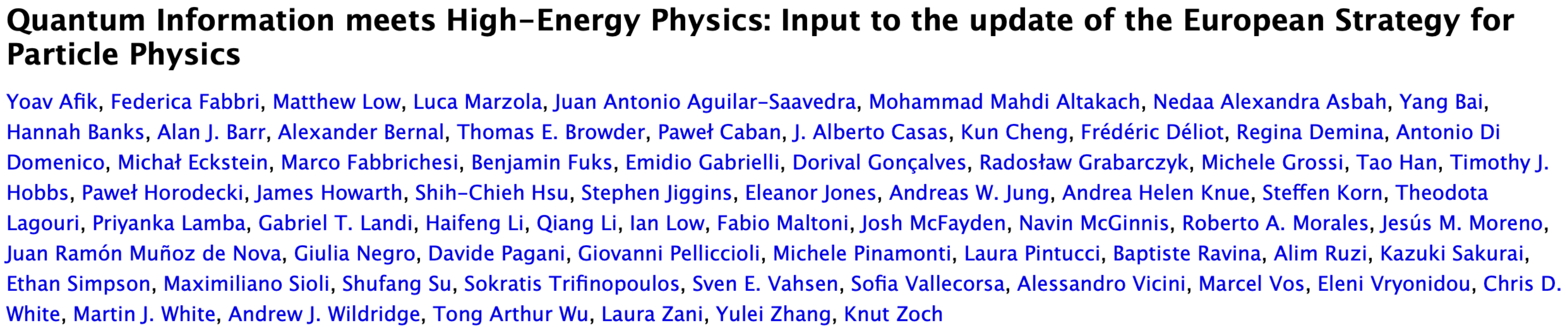
Tevatron measurements at D0 and CDF: measuring angular correlations between leptons and jets in semi-leptonic and dileptonic events

LHC measurements by ATLAS and CMS: Observation of non-zero spin correlation using $\Delta\phi$ in Run 1, differential measurements in Run 2

Paving the way to quantum information inspired measurements

ATLAS: First observation of quantum entanglement at the $t\bar{t}$ production threshold in the dilepton channel

CMS: Observation of quantum entanglement at the $t\bar{t}$ production threshold in the dilepton channel, first observation of quantum entanglement at high $t\bar{t}$ mass in the single lepton channel



Quantum Information meets High-Energy Physics: Input to the update of the European Strategy for Particle Physics

Yoav Afik, Federica Fabbri, Matthew Low, Luca Marzola, Juan Antonio Aguilar-Saavedra, Mohammad Mahdi Altakach, Nedaa Alexandra Asbah, Yang Bai, Hannah Banks, Alan J. Barr, Alexander Bernal, Thomas E. Browder, Paweł Caban, J. Alberto Casas, Kun Cheng, Frédéric Déliot, Regina Demina, Antonio Di Domenico, Michał Eckstein, Marco Fabbrichesi, Benjamin Fuks, Emidio Gabrielli, Dorival Gonçalves, Radosław Grabarczyk, Michele Grossi, Tao Han, Timothy J. Hobbs, Paweł Horodecki, James Howarth, Shih-Chieh Hsu, Stephen Jiggins, Eleanor Jones, Andreas W. Jung, Andrea Helen Knue, Steffen Korn, Theodota Lagouri, Priyanka Lamba, Gabriel T. Landi, Haifeng Li, Qiang Li, Ian Low, Fabio Maltoni, Josh McFayden, Navin McGinnis, Roberto A. Morales, Jesús M. Moreno, Juan Ramón Muñoz de Nova, Giulia Negro, Davide Pagani, Giovanni Pelliccioli, Michele Pinamonti, Laura Pintucci, Baptiste Ravina, Alim Ruzi, Kazuki Sakurai, Ethan Simpson, Maximiliano Sioli, Shufang Su, Sokratis Trifinopoulos, Sven E. Vahsen, Sofia Vallecorsa, Alessandro Vicini, Marcel Vos, Eleni Vryonidou, Chris D. White, Martin J. White, Andrew J. Wildridge, Tong Arthur Wu, Laura Zani, Yulei Zhang, Knut Zoch

And today a community is established and keeps growing

- Oxford, March 2023
- GGI, November 2023
- Pittsburgh, March 2024
- Oxford, October 2024
- GGI, April 2025
- Shanghai, July 2025

Quantum Observables for Collider Physics 2026

20 Apr 2026, 09:00 → 24 Apr 2026, 18:00 Europe/Zurich

4/3-006 - TH Conference Room (CERN)

Alan Barr (University of Oxford (GB)), Fabio Maltoni (Universite Catholique de Louvain (UCL) (BE) and Università di Bologna), Federica Fabbri (Universita e INFN, Bologna (IT)), Hyun Min Lee, Michele Grossi (CERN), Myeonghun Park (Seoul National University of Science and Technology (Seoultech)), Regina Demina (University of Rochester (US)), Sokratis Trifinopoulos (University of Zurich (CH)), Yoav Afik (University of Chicago (US))

This talk does:

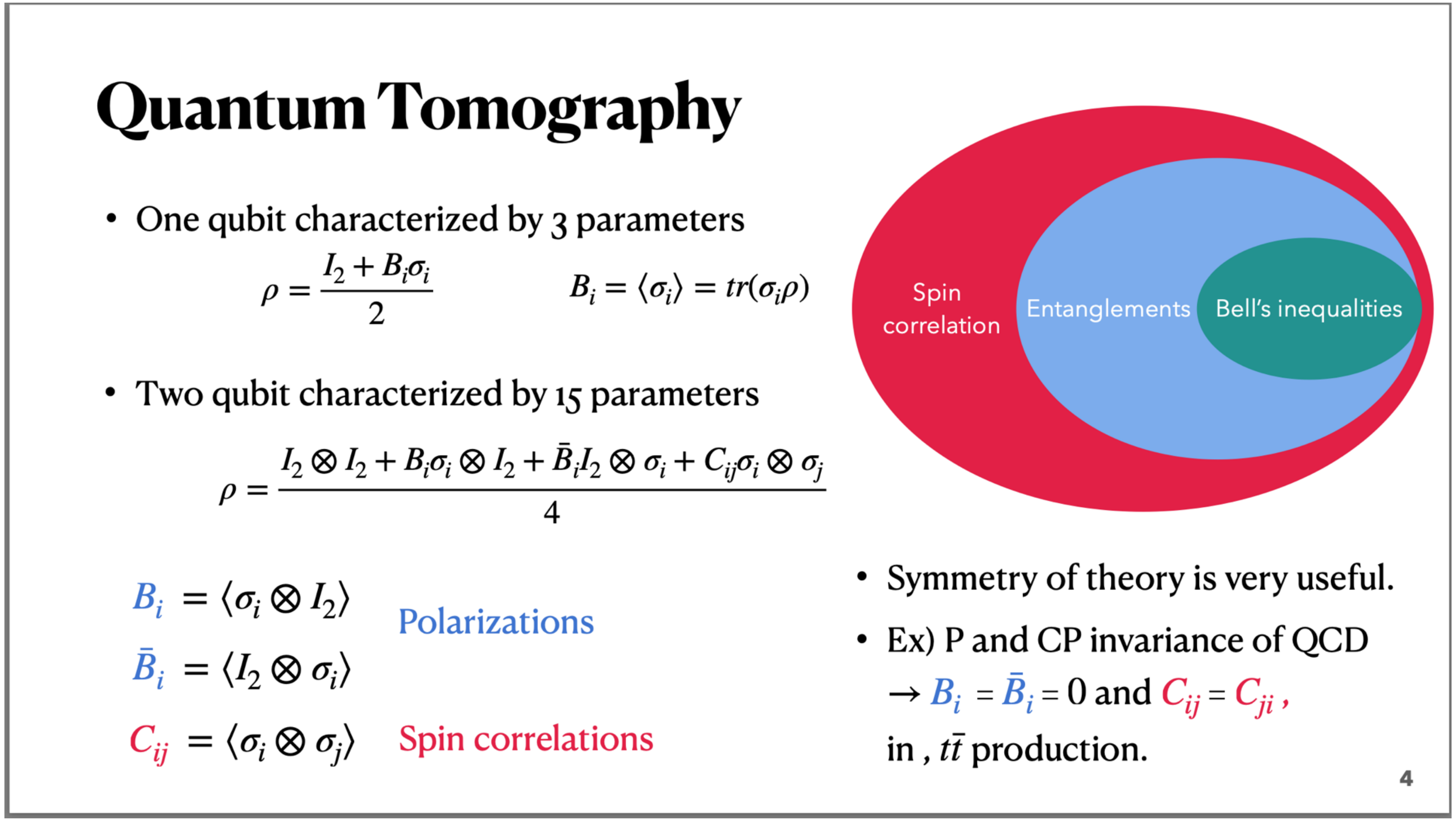
- Aim to give a brief summary of *some* of the workshop
- Highlight some points of interest (⚠ personal bias)

This talk does not:

- Give lots of theoretical details or discuss existing entanglement measurements → see Yoav's talk this afternoon
- Provide comprehensive coverage → the slides and recordings are publicly available

Focused on top-related elements for the LHC

A good place to start…



Quantum Tomography

- One qubit characterized by 3 parameters

$$\rho = \frac{I_2 + B_i\sigma_i}{2} \qquad B_i = \langle\sigma_i\rangle = tr(\sigma_i\rho)$$

- Two qubit characterized by 15 parameters

$$\rho = \frac{I_2 \otimes I_2 + B_i\sigma_i \otimes I_2 + \bar{B}_i I_2 \otimes \sigma_i + C_{ij}\sigma_i \otimes \sigma_j}{4}$$

$B_i = \langle\sigma_i \otimes I_2\rangle$

$\bar{B}_i = \langle I_2 \otimes \sigma_i\rangle$

Polarizations

$C_{ij} = \langle\sigma_i \otimes \sigma_j\rangle$ Spin correlations

Spin correlation

Entanglements

Bell's inequalities

- Symmetry of theory is very useful.
- Ex) P and CP invariance of QCD $\rightarrow B_i = \bar{B}_i = 0$ and $C_{ij} = C_{ji}$, in , $t\bar{t}$ production.

4

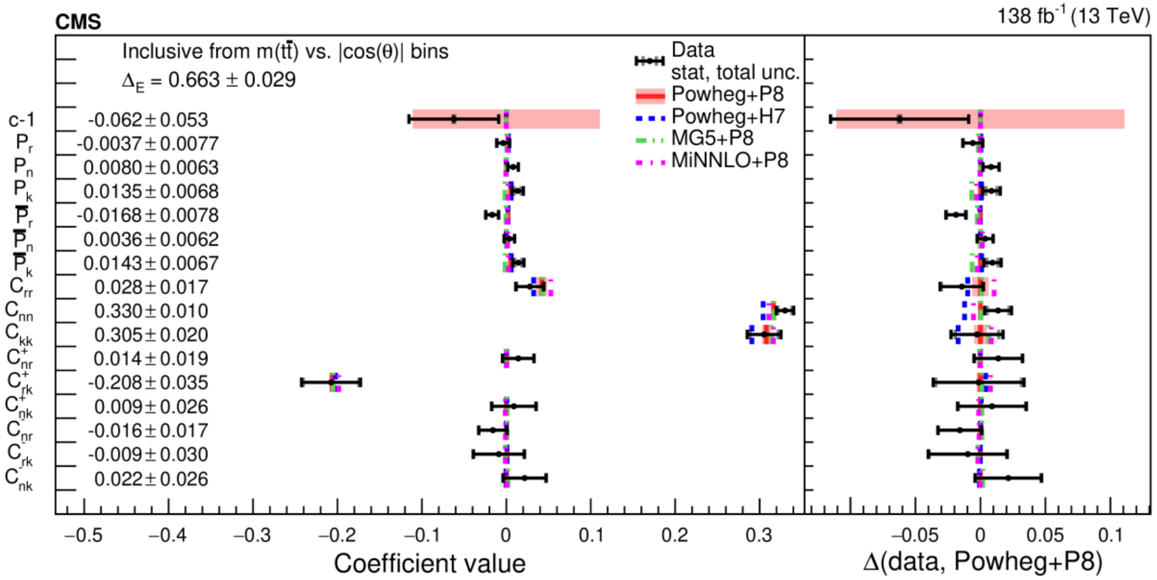
Slides from Dong Woo Kang

- Pedagogical overview of quantum information at colliders

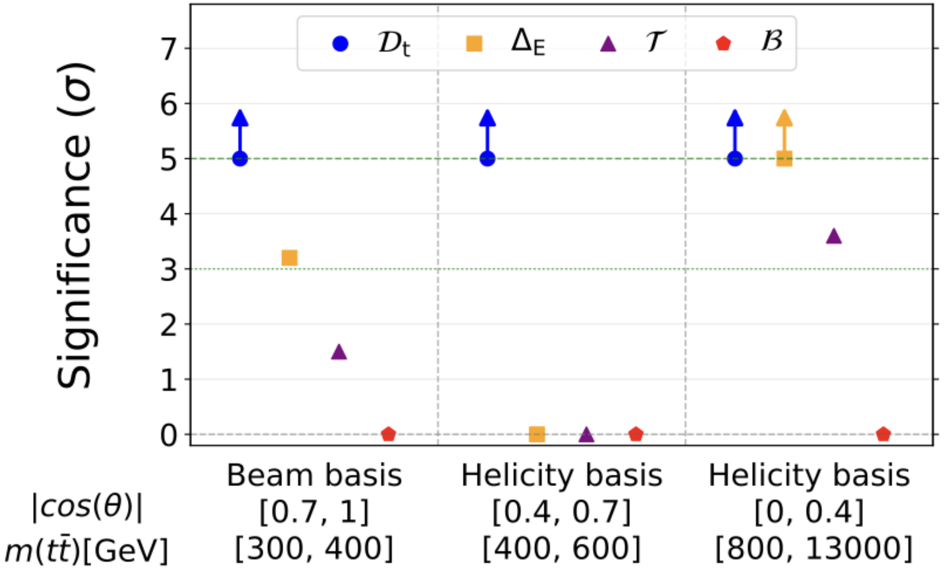
A good place to start...

Quantum tomography = full quantum description of the state

From which quantum observables can be derived



Phys. Rev. D **110**, 112016

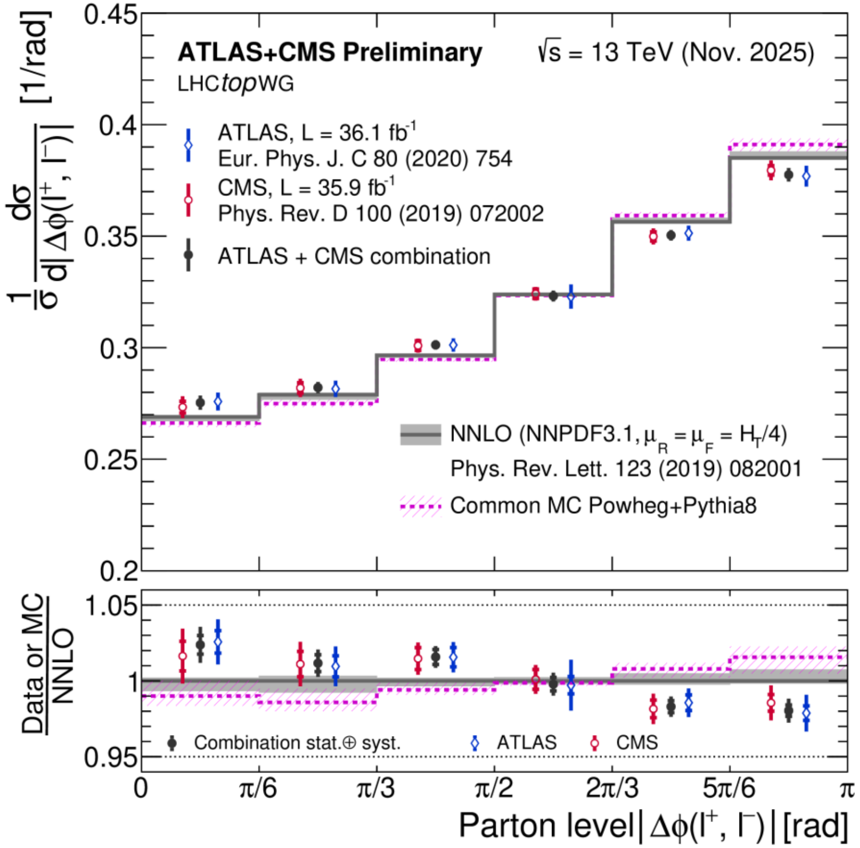


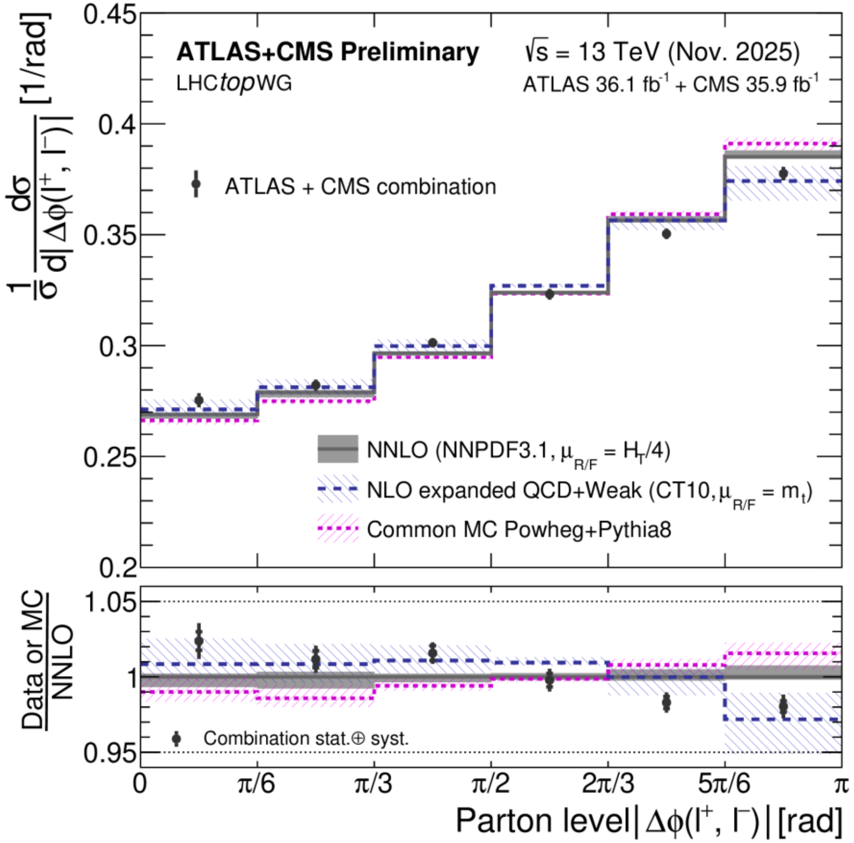
arXiv:2602.15115

Recent related results

Shown by Fiona Jolly

ATLAS-CONF-2026-001 CMS-PAS-TOP-22-004





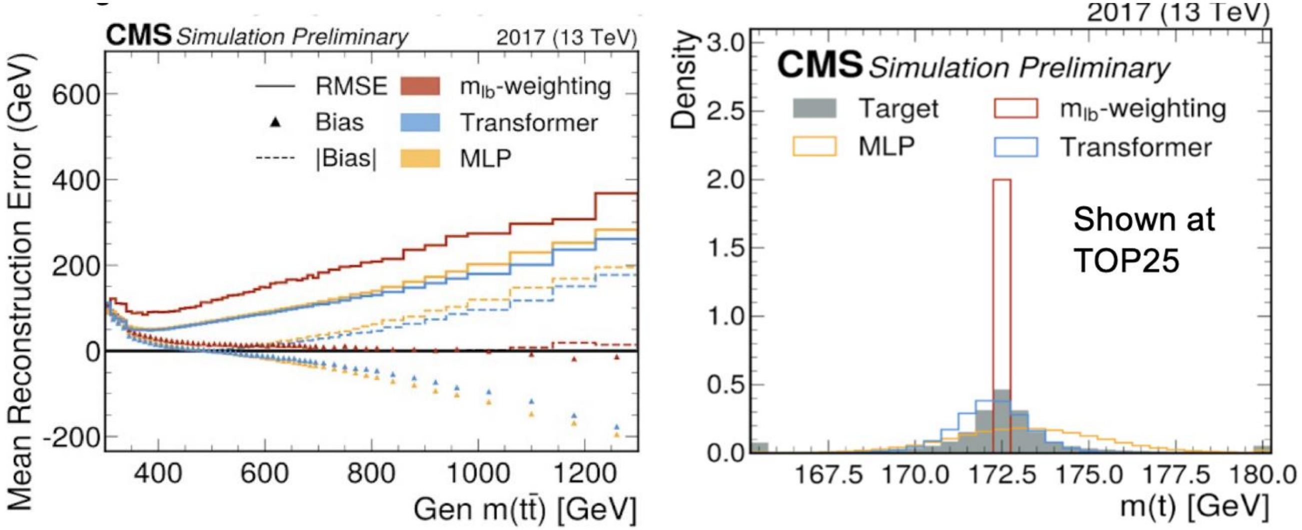
ATLAS+CMS combination of the azimuthal spin correlation variable in dilepton $t\bar{t}$ events

- Tension with common MC Powheg+Pythia8
- Improved agreement with fixed order NNLO predictions

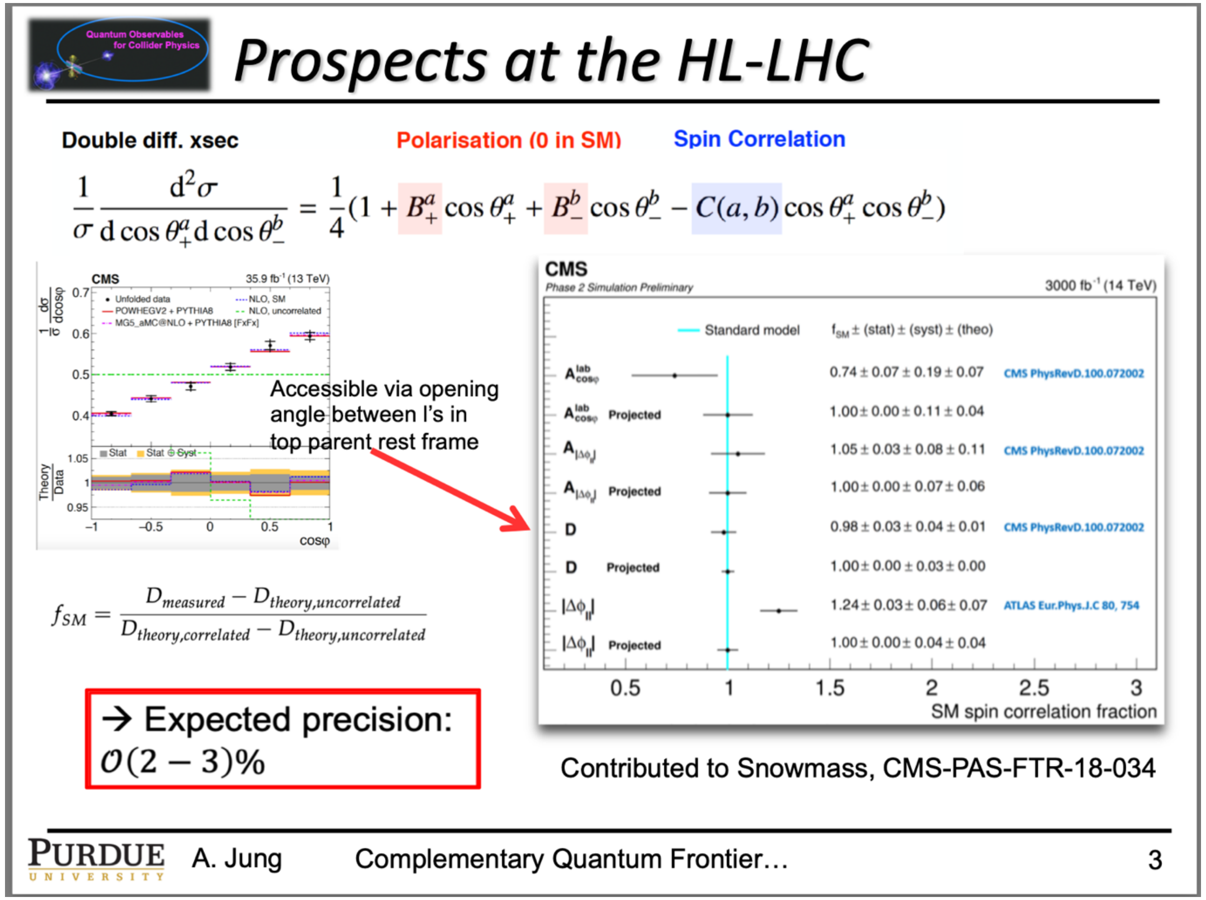
A probable future…

At the HL-LHC, we can expect a precision of $\mathcal{O}(2-3)\%$ on spin correlation measurements

- Addition of improved reconstruction tools will allow us to preform differential measurements



Shown at TOP25



Prospects at the HL-LHC

Double diff. xsec **Polarisation (0 in SM)** **Spin Correlation**

$$\frac{1}{\sigma}\frac{d^2\sigma}{d\cos\theta_+^a\, d\cos\theta_-^b} = \frac{1}{4}(1 + B_+^a\cos\theta_+^a + B_-^b\cos\theta_-^b - C(a,b)\cos\theta_+^a\cos\theta_-^b)$$

Accessible via opening angle between l's in top parent rest frame

$$f_{SM} = \frac{D_{measured} - D_{theory,uncorrelated}}{D_{theory,correlated} - D_{theory,uncorrelated}}$$

→ Expected precision: $\mathcal{O}(2-3)\%$

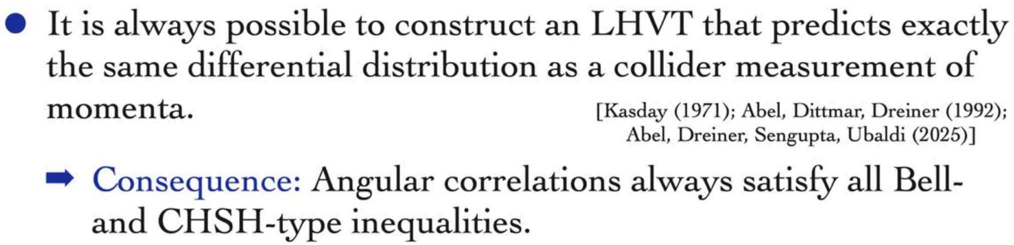
Contributed to Snowmass, CMS-PAS-FTR-18-034

Slides from Andreas Jung

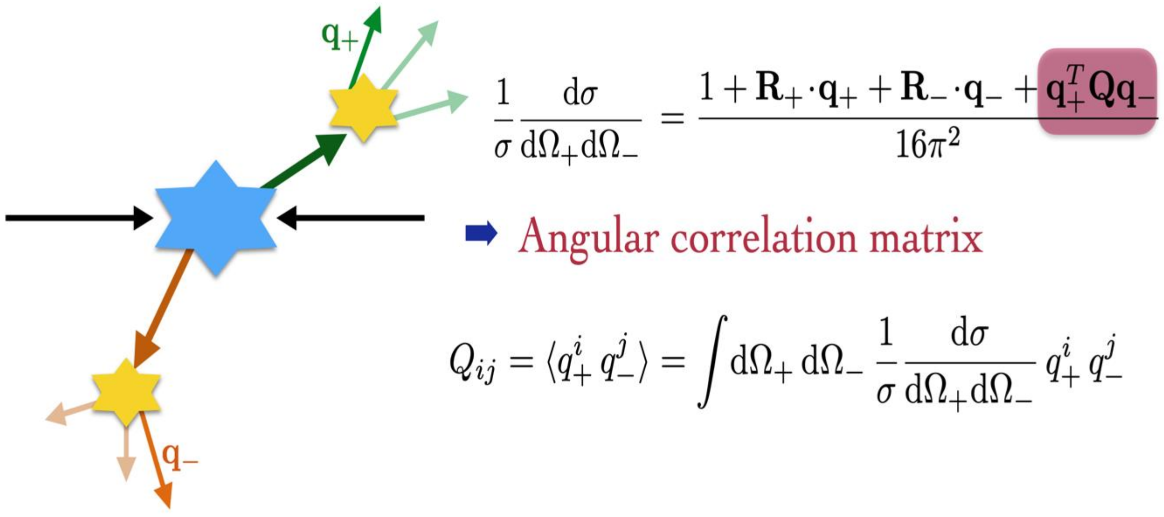
A probable future...

Bell inequality violation?

- 🚫 We measure angles (and energies) not spin-correlations directly



- It is always possible to construct an LHVT that predicts exactly the same differential distribution as a collider measurement of momenta. [Kasday (1971); Abel, Dittmar, Dreiner (1992); Abel, Dreiner, Sengupta, Ubaldi (2025)]
  - ➡ Consequence: Angular correlations always satisfy all Bell- and CHSH-type inequalities.



$$\frac{1}{\sigma}\frac{d\sigma}{d\Omega_+ d\Omega_-} = \frac{1+\mathbf{R}_+\cdot\mathbf{q}_+ + \mathbf{R}_-\cdot\mathbf{q}_- + \mathbf{q}_+^T\mathbf{Q}\mathbf{q}_-}{16\pi^2}$$

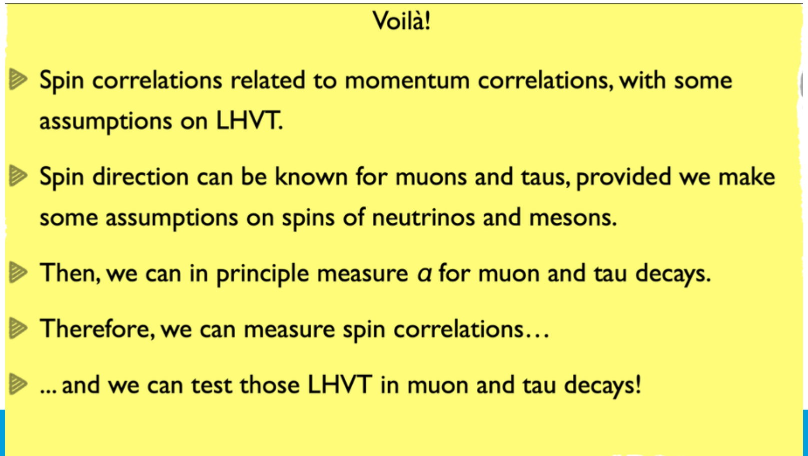
➡ Angular correlation matrix

$$Q_{ij} = \langle q_+^i\, q_-^j\rangle = \int d\Omega_+\, d\Omega_-\, \frac{1}{\sigma}\frac{d\sigma}{d\Omega_+ d\Omega_-}\, q_+^i\, q_-^j$$

Slides from Claude Duhr

$$\mathbf{Q} = \frac{\alpha_1\bar{\alpha}_1}{9}\,\mathbf{C}$$

- Related via *spin-analysing power*
  - Certain classes of LHVTs yield same relation but the bounds could be different
  - Measuring α experimentally could allow for certain classes of LHVTs to be excluded



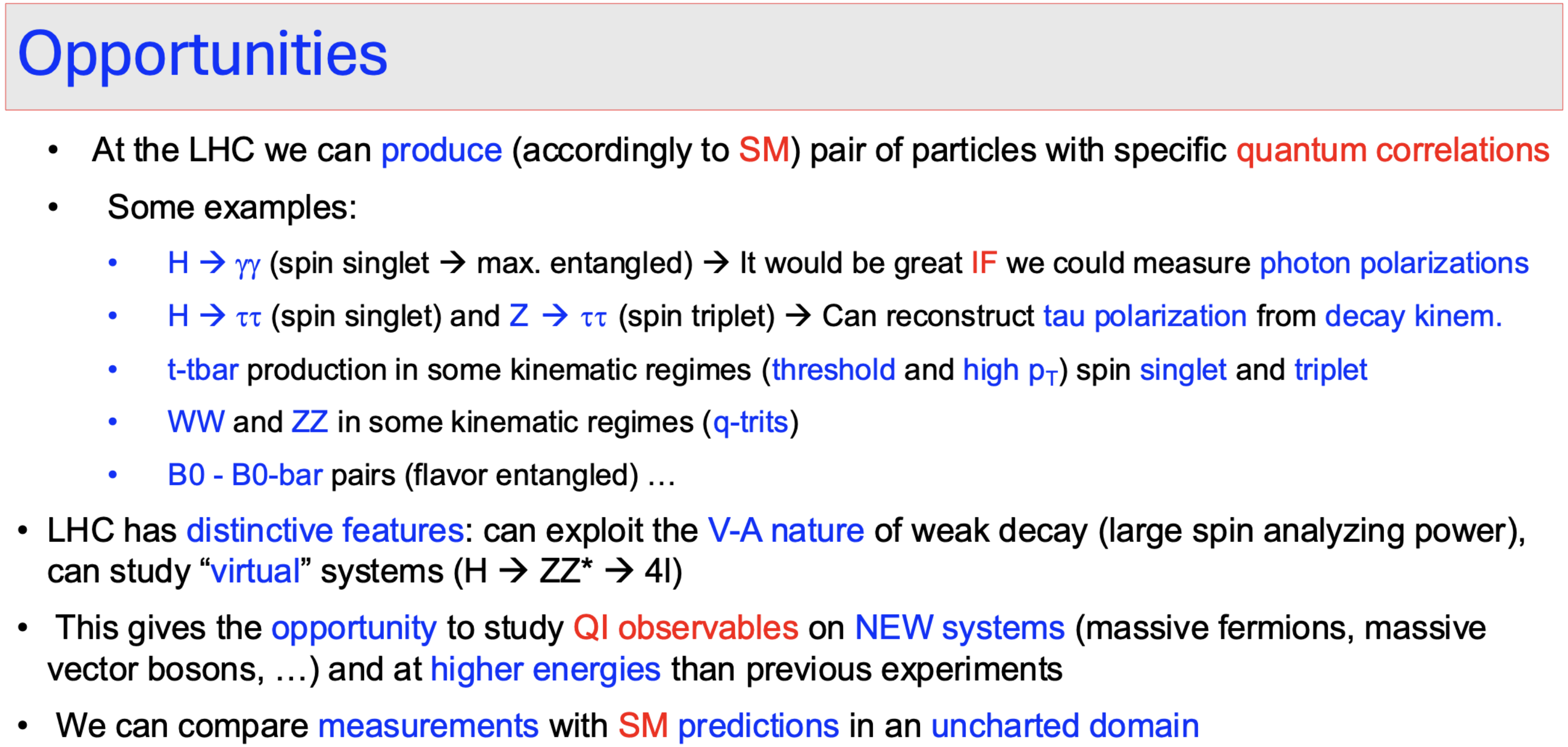
Voilà!

- Spin correlations related to momentum correlations, with some assumptions on LHVT.
- Spin direction can be known for muons and taus, provided we make some assumptions on spins of neutrinos and mesons.
- Then, we can in principle measure α for muon and tau decays.
- Therefore, we can measure spin correlations…
- … and we can test those LHVT in muon and tau decays!

Slide from Juan Antonio Aguilar Saavedra

A probable future…

Many opportunities to measure SM properties in an uncharted domain



Opportunities

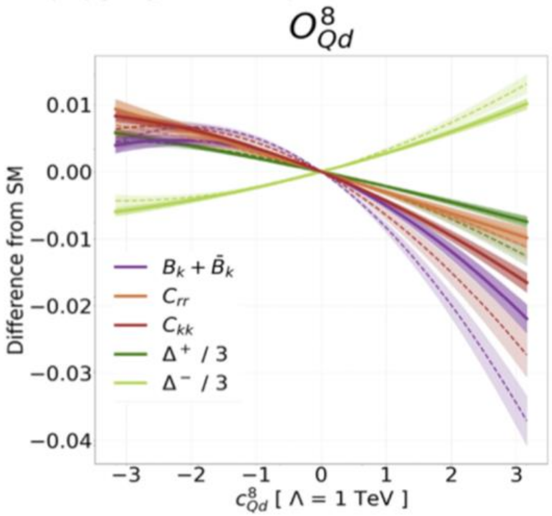
- At the LHC we can produce (accordingly to SM) pair of particles with specific quantum correlations
- Some examples:
  - $H \to \gamma\gamma$ (spin singlet → max. entangled) → It would be great IF we could measure photon polarizations
  - $H \to \tau\tau$ (spin singlet) and $Z \to \tau\tau$ (spin triplet) → Can reconstruct tau polarization from decay kinem.
  - t-tbar production in some kinematic regimes (threshold and high p_T) spin singlet and triplet
  - WW and ZZ in some kinematic regimes (q-trits)
  - B0 - B0-bar pairs (flavor entangled) …
- LHC has distinctive features: can exploit the V-A nature of weak decay (large spin analyzing power), can study “virtual” systems ($H \to ZZ^* \to 4l$)
- This gives the opportunity to study QI observables on NEW systems (massive fermions, massive vector bosons, …) and at higher energies than previous experiments
- We can compare measurements with SM predictions in an uncharted domain

- There are assumptions that we have to acknowledge
  - coming from a well-tested theory
- The scope of the measurements and complementarity to low-energy experiments is worth exploring!

Slide from Fabio Cerutti

A probable future...

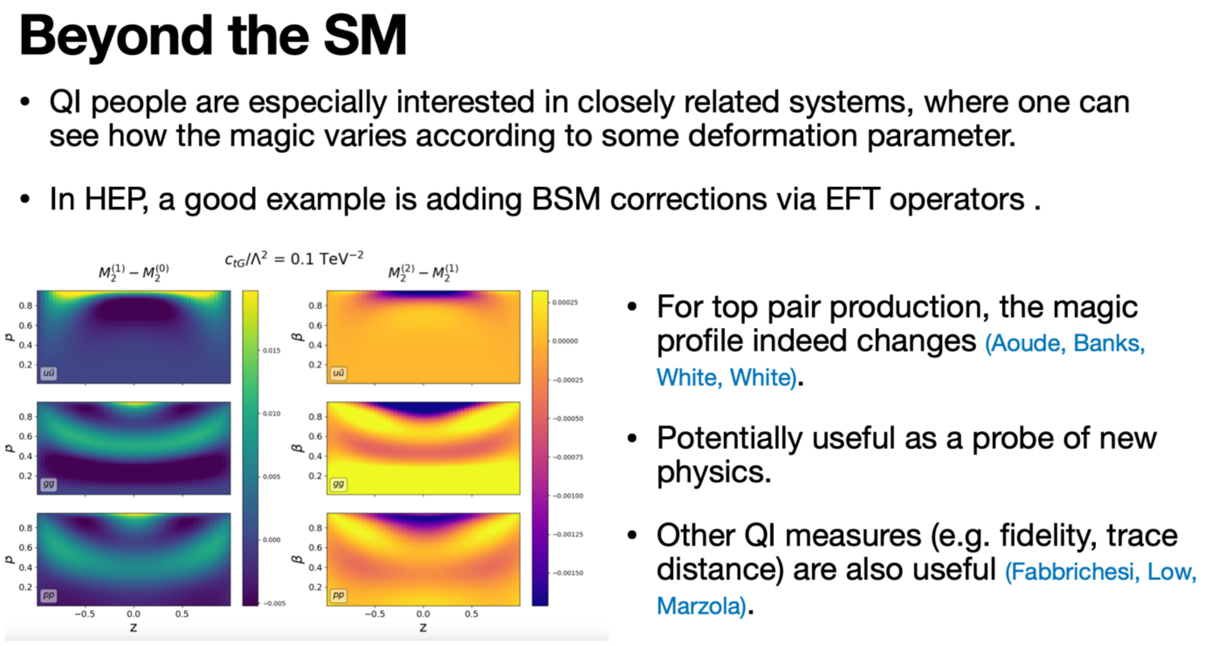
Slide from Andreas Jung



JHEP 01 (2023) 148
[2210.09330]

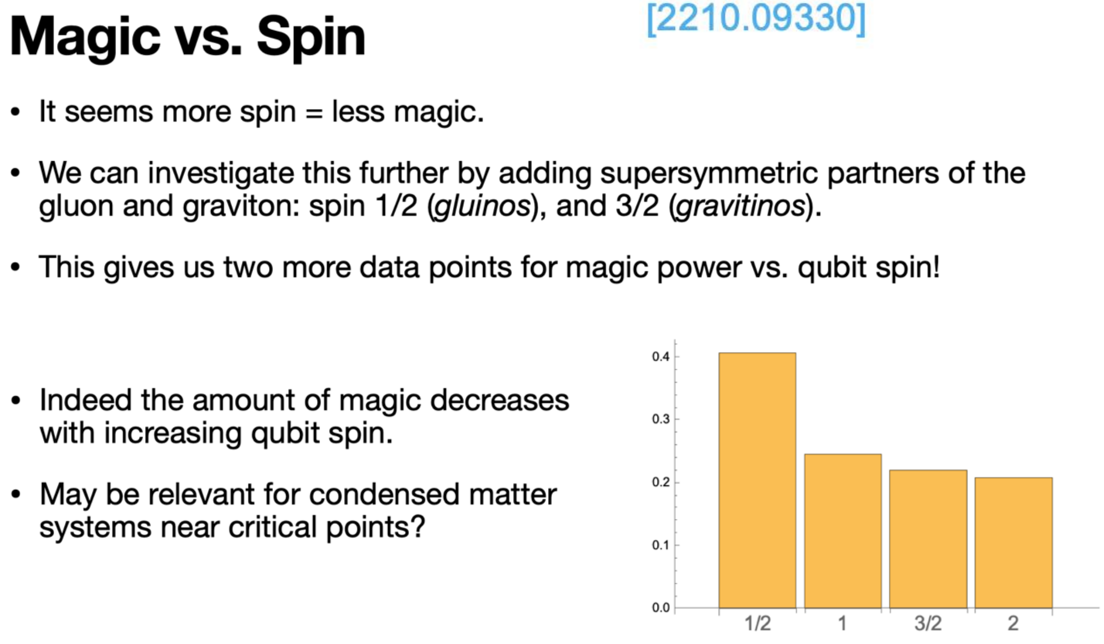
BSM?

- How far can we push limits on EFT?
- Can we use QI-inspired variables for BSM searches?



Beyond the SM

- QI people are especially interested in closely related systems, where one can see how the magic varies according to some deformation parameter.
- In HEP, a good example is adding BSM corrections via EFT operators .
- For top pair production, the magic profile indeed changes (Aoude, Banks, White, White).
- Potentially useful as a probe of new physics.
- Other QI measures (e.g. fidelity, trace distance) are also useful (Fabbrichesi, Low, Marzola).



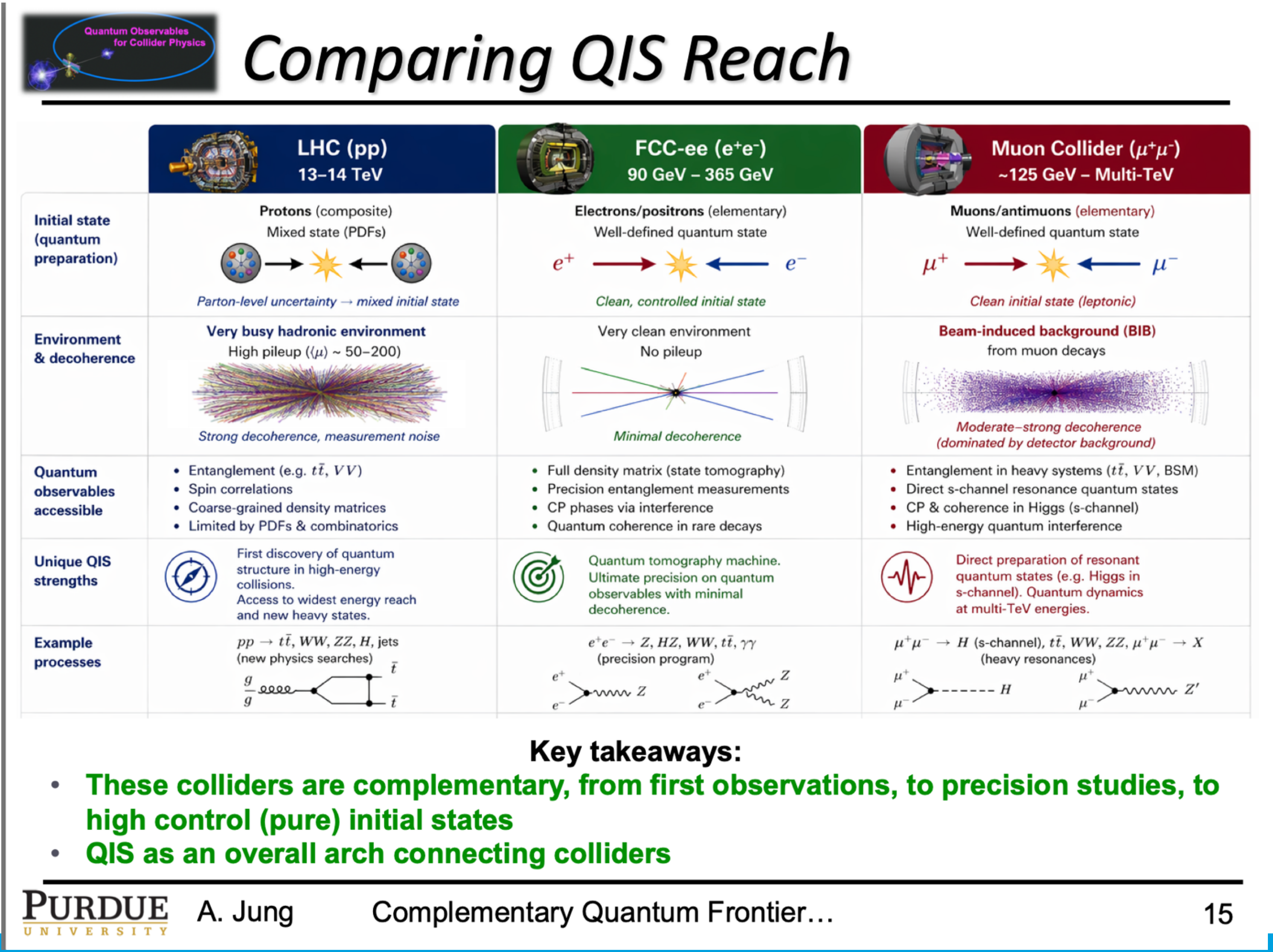
Magic vs. Spin

- It seems more spin = less magic.
- We can investigate this further by adding supersymmetric partners of the gluon and graviton: spin 1/2 (*gluinos*), and 3/2 (*gravitinos*).
- This gives us two more data points for magic power vs. qubit spin!
- Indeed the amount of magic decreases with increasing qubit spin.
- May be relevant for condensed matter systems near critical points?

Slides from Chris White

Slides from Andreas Jung

A possible future…



Quantum Observables for Collider Physics

Comparing QIS Reach

	LHC (pp) 13–14 TeV	FCC-ee (e^+e^-) 90 GeV – 365 GeV	Muon Collider ($\mu^+\mu^-$) ~125 GeV – Multi-TeV
Initial state (quantum preparation)	**Protons** (composite) Mixed state (PDFs) *Parton-level uncertainty → mixed initial state*	**Electrons/positrons** (elementary) Well-defined quantum state e^+ → ← e^- *Clean, controlled initial state*	**Muons/antimuons** (elementary) Well-defined quantum state μ^+ → ← μ^- *Clean initial state (leptonic)*
Environment & decoherence	**Very busy hadronic environment** High pileup ($\langle\mu\rangle \sim 50$–$200$) *Strong decoherence, measurement noise*	Very clean environment No pileup *Minimal decoherence*	**Beam-induced background (BIB)** from muon decays *Moderate–strong decoherence (dominated by detector background)*
Quantum observables accessible	• Entanglement (e.g. $t\bar{t}$, VV) • Spin correlations • Coarse-grained density matrices • Limited by PDFs & combinatorics	• Full density matrix (state tomography) • Precision entanglement measurements • CP phases via interference • Quantum coherence in rare decays	• Entanglement in heavy systems ($t\bar{t}$, VV, BSM) • Direct s-channel resonance quantum states • CP & coherence in Higgs (s-channel) • High-energy quantum interference
Unique QIS strengths	First discovery of quantum structure in high-energy collisions. Access to widest energy reach and new heavy states.	Quantum tomography machine. Ultimate precision on quantum observables with minimal decoherence.	Direct preparation of resonant quantum states (e.g. Higgs in s-channel). Quantum dynamics at multi-TeV energies.
Example processes	$pp \to t\bar{t}, WW, ZZ, H$, jets (new physics searches)	$e^+e^- \to Z, HZ, WW, t\bar{t}, \gamma\gamma$ (precision program)	$\mu^+\mu^- \to H$ (s-channel), $t\bar{t}, WW, ZZ, \mu^+\mu^- \to X$ (heavy resonances)

Key takeaways:

- **These colliders are complementary, from first observations, to precision studies, to high control (pure) initial states**
- **QIS as an overall arch connecting colliders**

PURDUE UNIVERSITY A. Jung Complementary Quantum Frontier… 15

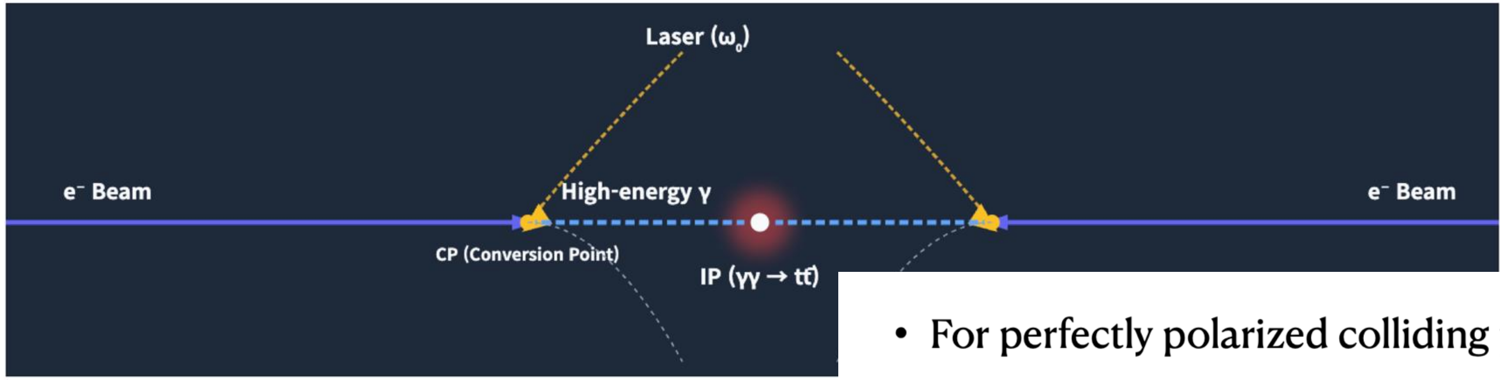
Future colliders could offer complementary approaches for QI observable measurements

- FCC-ee would allow for very precise measurements with minimal decoherence
- A muon collider could give access to entanglement in heavy systems at multi-TeV energies

Slides from Dong Woo Kang

A possible future…

[Ginzburg, Kotkin, Serbo, Telnov '83]

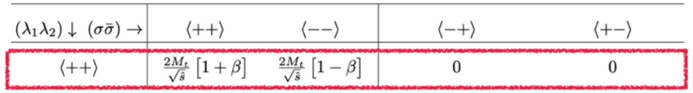


Entire region is entangled and violates CHSH inequality

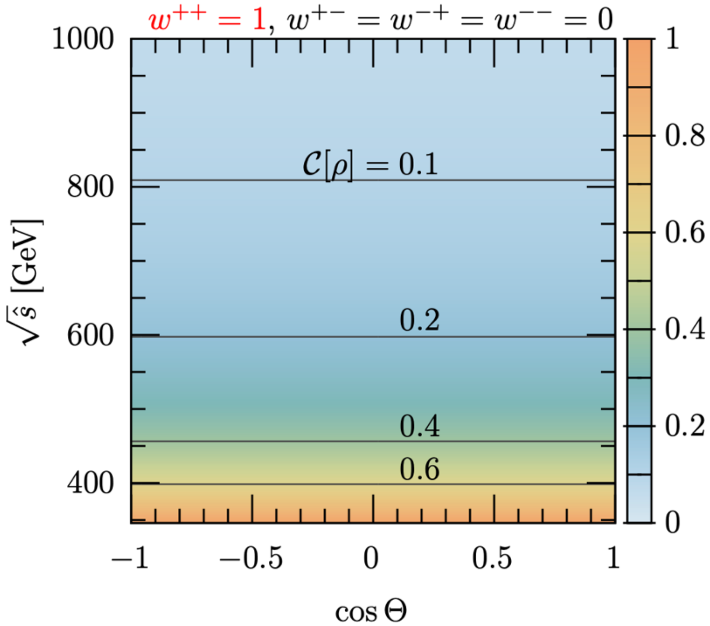
$t\bar{t}$ at a photon collider?

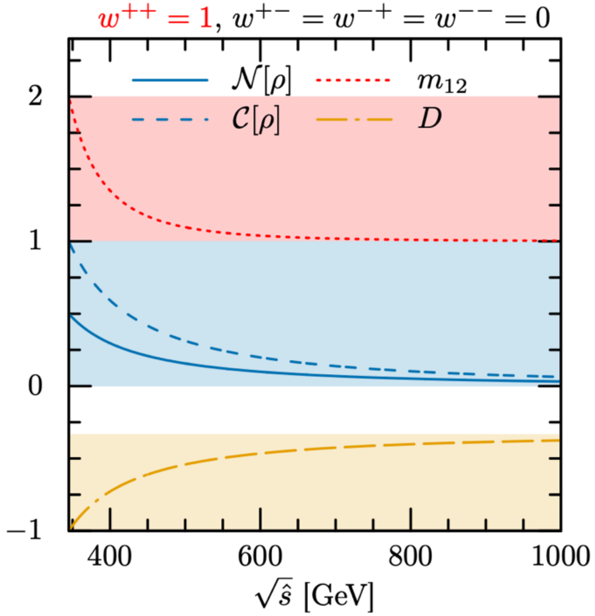
- A future linear e^+e^- collider could provide very high-energy photons from the Compton back-scattering of the laser light with the $e^\pm$ beam
- Can control the polarisation of the initial photons

- For perfectly polarized colliding photons,



$(\lambda_1\lambda_2)\downarrow$ $(\sigma\bar{\sigma})\rightarrow$	$\langle ++\rangle$	$\langle --\rangle$	$\langle -+\rangle$	$\langle +-\rangle$
$\langle ++\rangle$	$\frac{2M_t}{\sqrt{\hat{s}}}[1+\beta]$	$\frac{2M_t}{\sqrt{\hat{s}}}[1-\beta]$	0	0



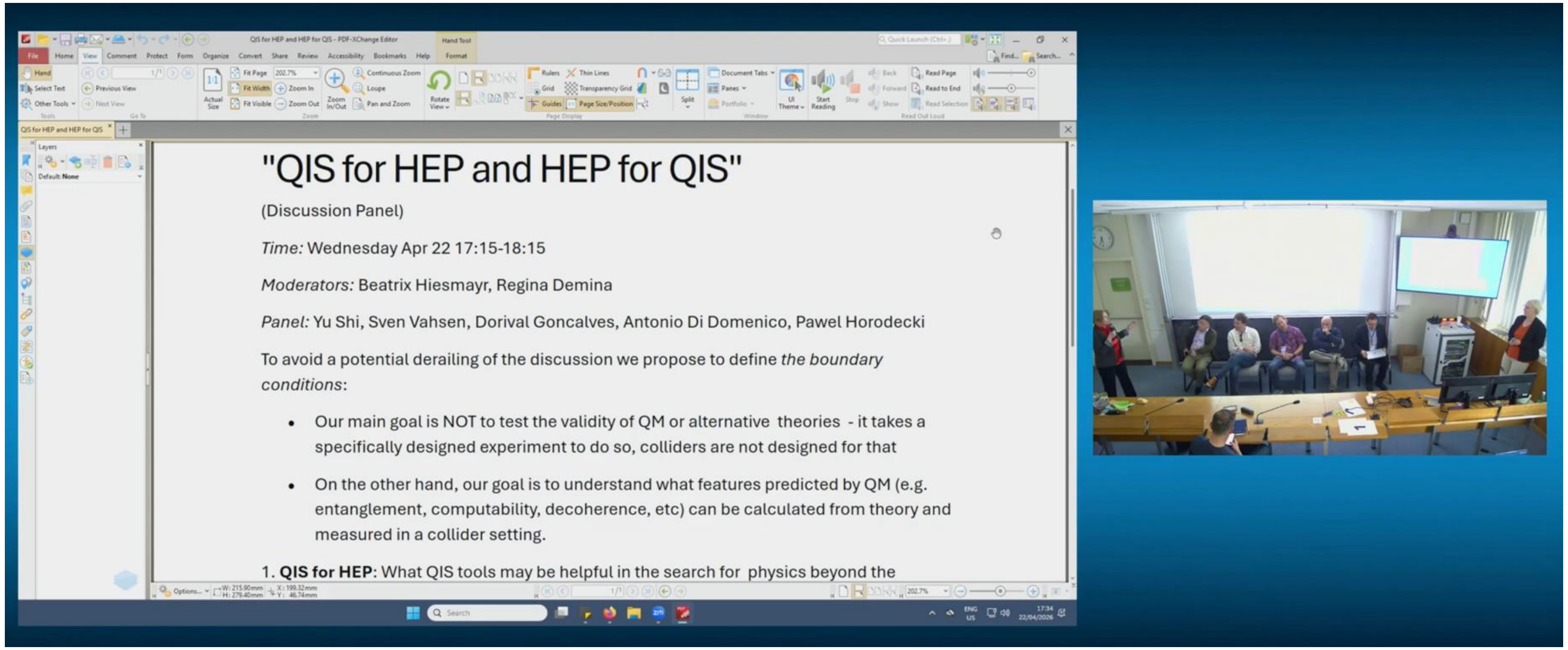


42

QIS for HEP, HEP for QIS

Discussion panel with experts from both fields

- What features are interesting to measure in colliders?
- What can we learn from each other?
- Are there tools from QIS that can help with the search for BSM?
- Can HEP systems find practical applications in QIS ?



"QIS for HEP and HEP for QIS"

(Discussion Panel)

Time: Wednesday Apr 22 17:15-18:15

Moderators: Beatrix Hiesmayr, Regina Demina

Panel: Yu Shi, Sven Vahsen, Dorival Goncalves, Antonio Di Domenico, Pawel Horodecki

To avoid a potential derailing of the discussion we propose to define *the boundary conditions*:

- Our main goal is NOT to test the validity of QM or alternative theories - it takes a specifically designed experiment to do so, colliders are not designed for that
- On the other hand, our goal is to understand what features predicted by QM (e.g. entanglement, computability, decoherence, etc) can be calculated from theory and measured in a collider setting.

1. **QIS for HEP**: What QIS tools may be helpful in the search for physics beyond the

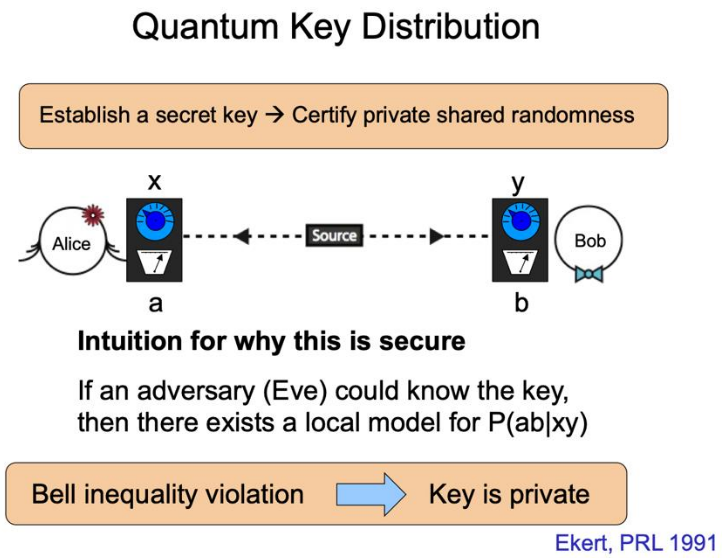
Key takeaways:

- an open dialogue between the fields is necessary and welcomed
- a common dictionary should be developed

In context…

Other than testing fundamental properties, what is useful about Quantum Information?

- Practical applications include quantum computing, quantum cryptography…
- Quantum sensors for experiments



Quantum Key Distribution

Establish a secret key → Certify private shared randomness

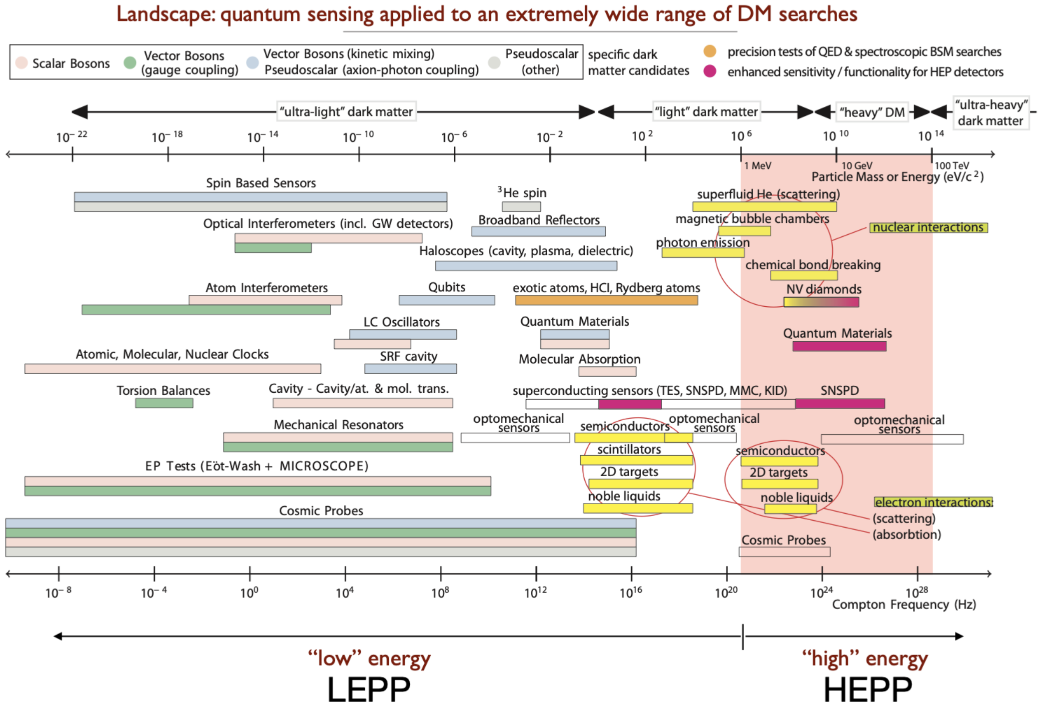
Intuition for why this is secure

If an adversary (Eve) could know the key, then there exists a local model for P(ab|xy)

Bell inequality violation → Key is private

Ekert, PRL 1991

Plenary talk from Nicolas Brunner



Plenary talk from Michael Doser

Loopholes everywhere…

Towards ultimate test

Locality loophole → Space-like separation

Photons: Aspect et al. 1982; Gisin, Zeilinger groups 1998

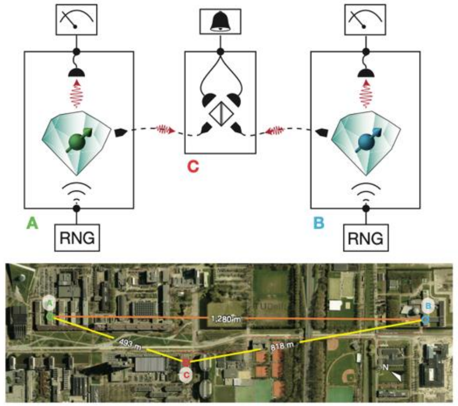
Detection loophole → High detection efficiency >70%

Atoms: Monroe group 2001

Big challenge: close both loopholes at the same time

Plenary talk from Nicolas Brunner

Loophole-free Bell tests 2015



Space-like sep
&
High efficiency

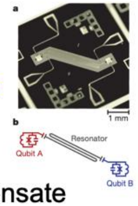
S = 2.42 ± 0.20

Delft, Hanson group
Nature 2015

2 photonic experiments: NIST Shalm et al. 2015. Vienna Giustina et al. 2015

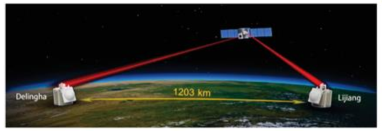
Bell test zoo

2009: Superconducting qubits
Martinis group
→ Loophole-free in 2023 Walraff group



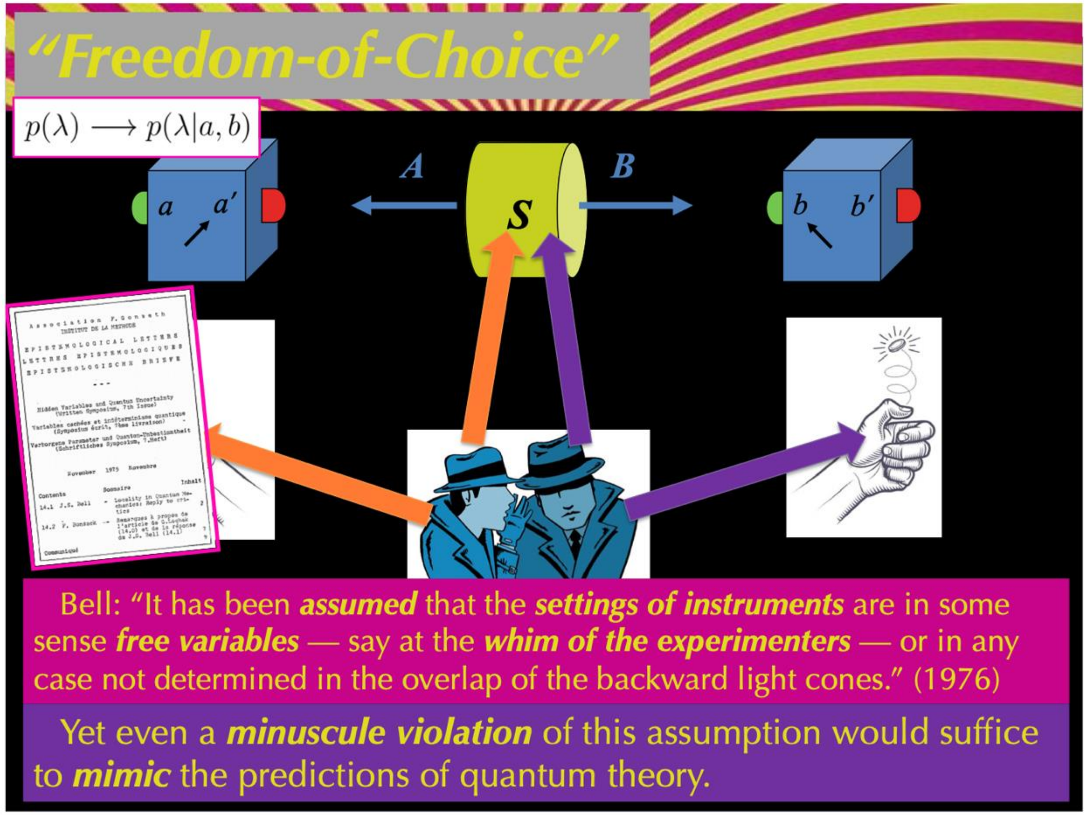
2016: Bell correlations in Bose-Einstein condensate
Treutlein group

2017: Bell tests via satelites >10^3 km Pan group



2024: Entanglement detection at CERN (Atlas & CMS)

Loopholes everywhere…

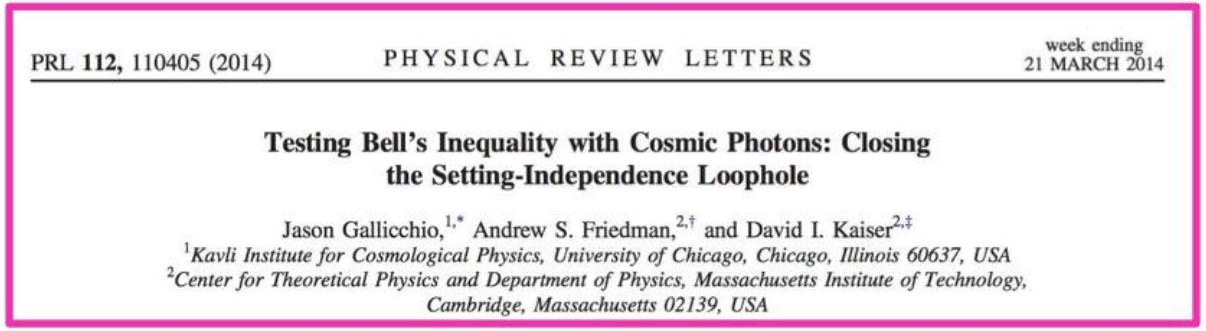


Bell: “It has been ***assumed*** that the ***settings of instruments*** are in some sense ***free variables*** — say at the ***whim of the experimenters*** — or in any case not determined in the overlap of the backward light cones.” (1976)

Yet even a ***minuscule violation*** of this assumption would suffice to ***mimic*** the predictions of quantum theory.

Can this be closed with *Cosmic Bell Tests?*

- Choose distant objects, e.g. quasars, whose light we observe today was emitted as early in cosmic history as possible to select the measurement settings

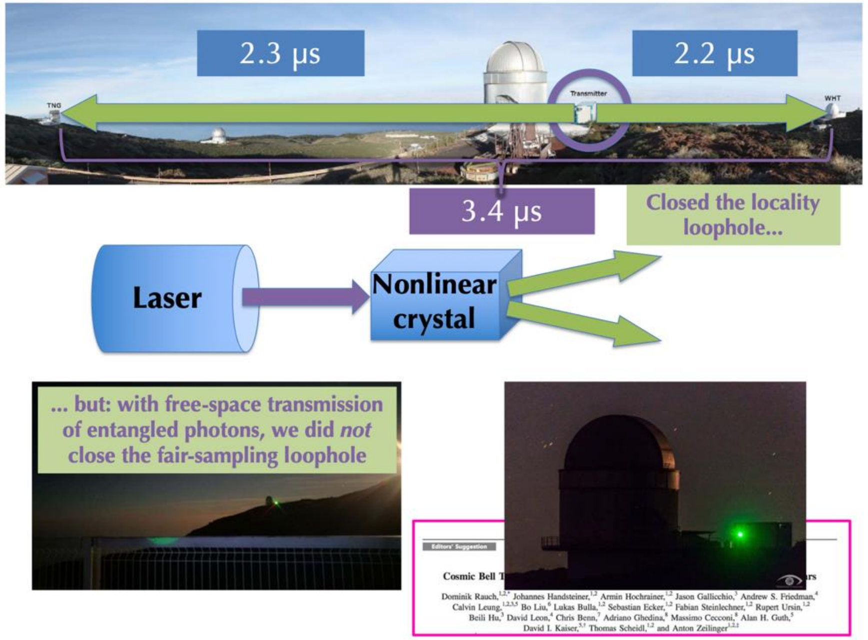

PRL **112,** 110405 (2014) PHYSICAL REVIEW LETTERS week ending 21 MARCH 2014

Testing Bell’s Inequality with Cosmic Photons: Closing the Setting-Independence Loophole

Jason Gallicchio,[1,*] Andrew S. Friedman,[2,†] and David I. Kaiser[2,‡]
[1]*Kavli Institute for Cosmological Physics, University of Chicago, Chicago, Illinois 60637, USA*
[2]*Center for Theoretical Physics and Department of Physics, Massachusetts Institute of Technology, Cambridge, Massachusetts 02139, USA*

CERN colloquium from David Kaiser

Loopholes everywhere…



Closed the locality loophole…

… but: with free-space transmission of entangled photons, we did *not* close the fair-sampling loophole

Editors' Suggestion

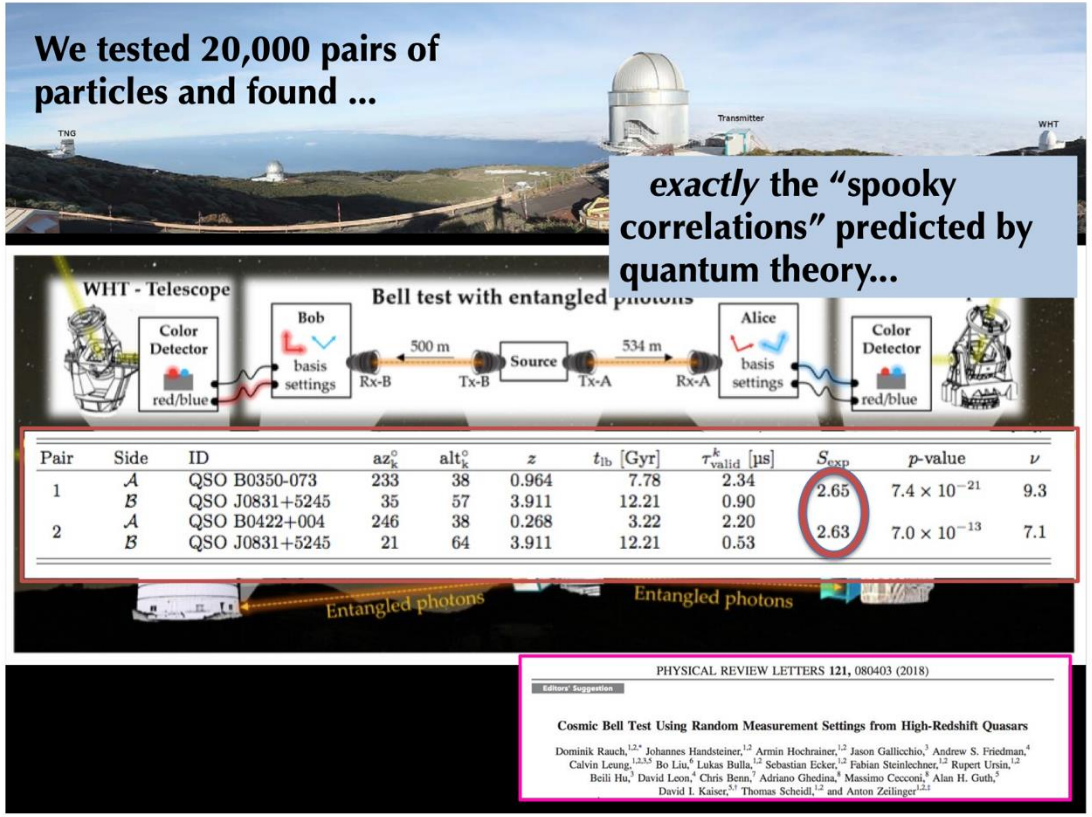
Cosmic Bell T

Dominik Rauch,[1,2,*] Johannes Handsteiner,[1,2] Armin Hochrainer,[1,2] Jason Gallicchio,[3] Andrew S. Friedman,[4]
Calvin Leung,[1,2,3,5] Bo Liu,[6] Lukas Bulla,[1,2] Sebastian Ecker,[1,2] Fabian Steinlechner,[1,2] Rupert Ursin,[1,2]
Beili Hu,[3] David Leon,[4] Chris Benn,[7] Adriano Ghedina,[8] Massimo Cecconi,[8] Alan H. Guth,[5]
David I. Kaiser,[5,†] Thomas Scheidl,[1,2] and Anton Zeilinger[1,2,‡]

CERN colloquium from David Kaiser

Can this be closed with *Cosmic Bell Tests?*

- ✅ 2/3 loopholes closed and entanglement seen



We tested 20,000 pairs of particles and found …

exactly the "spooky correlations" predicted by quantum theory…

Pair	Side	ID	az_k°	alt_k°	z	t_{lb} [Gyr]	τ_{valid}^k [μs]	S_{exp}	p-value	ν
1	$\mathcal{A}$	QSO B0350-073	233	38	0.964	7.78	2.34	2.65	7.4×10^{-21}	9.3
	$\mathcal{B}$	QSO J0831+5245	35	57	3.911	12.21	0.90			
2	$\mathcal{A}$	QSO B0422+004	246	38	0.268	3.22	2.20	2.63	7.0×10^{-13}	7.1
	$\mathcal{B}$	QSO J0831+5245	21	64	3.911	12.21	0.53			

PHYSICAL REVIEW LETTERS **121,** 080403 (2018)

Editors' Suggestion

Cosmic Bell Test Using Random Measurement Settings from High-Redshift Quasars

Dominik Rauch,[1,2,*] Johannes Handsteiner,[1,2] Armin Hochrainer,[1,2] Jason Gallicchio,[3] Andrew S. Friedman,[4]
Calvin Leung,[1,2,3,5] Bo Liu,[6] Lukas Bulla,[1,2] Sebastian Ecker,[1,2] Fabian Steinlechner,[1,2] Rupert Ursin,[1,2]
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P.S. Hippies? CIA? ESP?

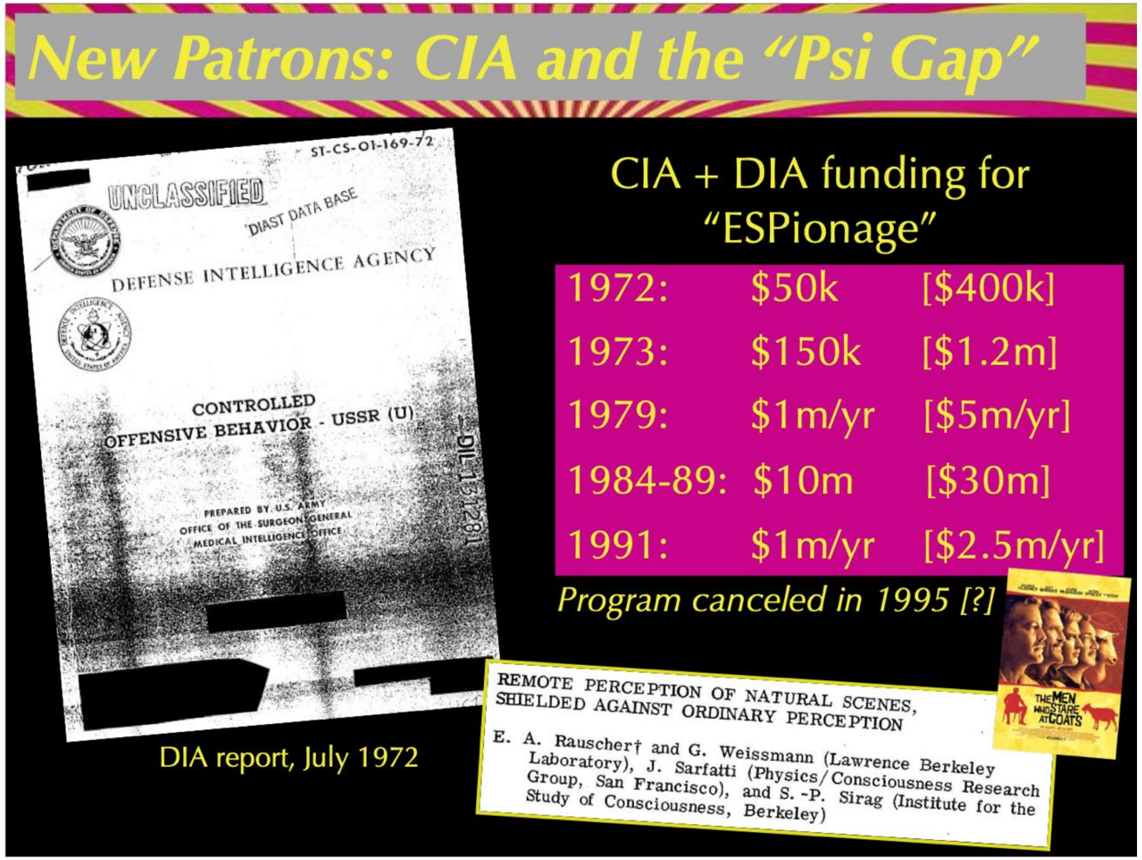
Counterculture Darlings

Sarfatti and co. were "going into trances, working at telepathy, and dipping into their subconscious in experiments toward psychic mobility." *City Magazine [SF]*, 1975

Jack Sarfatti, Saul-Paul Sirag, Nick Herbert, Fred Alan Wolf, 1975

Similar descriptions appeared in magazines and newspapers throughout California; as far away as the *New Hampshire Sunday News*; and in *Time* and *Newsweek*.

[CERN colloquium](#) from David Kaiser



New Patrons: CIA and the "Psi Gap"

[redacted]

ST-CS-01-169-72

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DEFENSE INTELLIGENCE AGENCY

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PREPARED BY U.S. ARMY
OFFICE OF THE SURGEON GENERAL
MEDICAL INTELLIGENCE OFFICE

DIL 131281

[redacted]

[redacted]

[redacted]

DIA report, July 1972

CIA + DIA funding for "ESPionage"

1972:	$50k	[$400k]
1973:	$150k	[$1.2m]
1979:	$1m/yr	[$5m/yr]
1984-89:	$10m	[$30m]
1991:	$1m/yr	[$2.5m/yr]

Program canceled in 1995 [?]

REMOTE PERCEPTION OF NATURAL SCENES, SHIELDED AGAINST ORDINARY PERCEPTION

E. A. Rauscher† and G. Weissmann (Lawrence Berkeley Laboratory), J. Sarfatti (Physics/Consciousness Research Group, San Francisco), and S.-P. Sirag (Institute for the Study of Consciousness, Berkeley)

We look forward to the next chapter!

(Dates TBC)

QIHEP

Quantum Information and High Energy Physics

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