# ETMC Meeting 2026

# Report of Contributions

https://indico.global/e/16475

Contribution ID: **1** Type: **not specified**

# Opportunities with hyperon and charmed baryon decays

*Wednesday, 25 February 2026 10:30 (30 minutes)*

Overview of our work and other opportunities

**Author:** Dr BACCHIO, Simone (The Cyprus Institute)

**Presenter:** Dr BACCHIO, Simone (The Cyprus Institute)

**Session Classification:** Session

Contribution ID: **2** Type: **not specified**

# Quark and Gluon Momentum and Spin Fractions in the Nucleon

*Wednesday, 25 February 2026 12:30 (30 minutes)*

We present the full decomposition of the momentum and spin fractions carried by quarks and gluons in the nucleon. We employ three gauge ensembles generated with Nf=2+1+1 Wilson twisted-mass clover-improved fermions at the physical quark masses. It allows us to determine for the first time the momentum and spin decompositions at the continuum limit with the extrapolation directly performed at the physical pion mass.

**Authors:** KUMMER, Christian (University of cyprus); ALEXANDROU, Constantia; KOUTSOU, Giannis (The Cyprus Institutes); Dr SPANOUDES, Gregoris (University of Cyprus); RODRIGUEZ CHACON, Luis Alberto (The Cyprus institute); Dr BACCHIO, Simone (The Cyprus Institute); LI, Yan

**Presenter:** LI, Yan

**Session Classification:** Session

Contribution ID: **3** Type: **not specified**

# Nucleon electromagnetic form factors using $N_f = 2 + 1 + 1$ twisted-mass fermions at the physical point

*Wednesday, 25 February 2026 13:00 (30 minutes)*

We present the results for the electromagnetic form factors of the proton and neutron using three ensembles of twisted mass fermions at the physical point. Studying the momentum transfer dependence of the form factors resulting from a multi-state fitting procedure, we obtain the electric and magnetic radii and the magnetic moments in the continuum limit. Furthermore, we extend the analysis to obtain the strange nucleon electromagnetic form factors using four ensembles of twisted mass fermions. The disconnected strange contributions are computed with high statistics two-point functions combined with the quark loop computed by employing stochastic noise mitigation techniques such as spin-color dilution and hierarchical probing. Our final results include systematics arising from excited states, cut-off effects, the functional form of the momentum transfer dependence and the momenta cuts.

**Authors:** ALEXANDROU, Constantia; Dr BACCHIO, Simone (The Cyprus Institute); FINKENRATH, Jacob Friedrich; IONA, Christos (The Cyprus Institute, University of Cyprus); KOUTSOU, Giannis (The Cyprus Institutes); Dr PITTLER, Ferenc (The Cyprus Institute); PRASAD, Bhavna (The Cyprus Institute); Dr SPANOUDES, Gregoris (University of Cyprus)

**Presenter:** PRASAD, Bhavna (The Cyprus Institute)

**Session Classification:** Session

Contribution ID: **4** Type: **not specified**

# Inclusive Semileptonic Decay from Lattice QCD

*Wednesday, 25 February 2026 10:00 (30 minutes)*

In this talk, we present the first fully non-perturbative computation of the decay rate of $D_s \to X\ell\nu$ and of the associated leptonic moments, carried out on state-of-the-art ETMC ensembles at the physical point with four lattice spacings and three volumes. The extraction of the relevant smeared spectral densities from Euclidean four-point correlation functions has been performed with controlled statistical and systematic uncertainties by using the Hansen-Lupo-Tantalo method. Additionally, we present preliminary results of our ongoing calculation of the inclusive semi-leptonic $B_s$ mesons decay rates with focus on some important technical aspects of the calculation.

**Author:** GAROFALO, marco (University of Bonn, HISKP)

**Presenter:** GAROFALO, marco (University of Bonn, HISKP)

**Session Classification:** Session

Contribution ID: **5** Type: **not specified**

# Update on tau

*Wednesday, 25 February 2026 17:00 (30 minutes)*

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**Author:** TANTALO, Nazario (Universita e INFN Roma Tor Vergata (IT))

**Presenter:** TANTALO, Nazario (Universita e INFN Roma Tor Vergata (IT))

**Session Classification:** Session

Contribution ID: **6** Type: **not specified**

# Diagonal Kenney-Laub Rational Approximation to the Overlap Dirac Operator

*Thursday, 26 February 2026 14:30 (30 minutes)*

Preliminary results are presented for a novel formulation of the overlap Dirac operator in lattice QCD that employs the diagonal Kenney-Laub (KL) iterates to approximate the matrix sign function. KL iterates require no information about the spectrum of the kernel operator and, when expressed via their partial fraction decomposition, offer a practical alternative for approximating the matrix sign function. We evaluate this approach in a proof-of-concept implementation using quenched lattices at $\beta = 6.20$ and two discretizations of the Dirac operator as a kernel, namely the standard Wilson operator and the Brillouin operator. By examining the violation of the Ginsparg-Wilson relation (using a specific metric) and the critical bare quark mass for increasing approximation order, we find that KL-iterates exhibit improved chiral symmetry preservation and computational efficiency compared to the Chebyshev polynomial and Zolotarev rational approaches.

**Authors:** KOUTSOU, Giannis (The Cyprus Institutes); DURR, Stephan (University of Wuppertal); Mr GREGORIOU, Stylianos (The Cyprus Institute)

**Presenter:** Mr GREGORIOU, Stylianos (The Cyprus Institute)

**Session Classification:** Session

Contribution ID: **7** Type: **not specified**

# TMDPDFs in twisted-mass lattice QCD

*Thursday, 26 February 2026 11:00 (30 minutes)*

We present a lattice QCD calculation of the unpolarized transverse-momentum dependent parton distribution function (TMD PDF) of the nucleon using Large Momentum Effective Field Theory. The calculation is based on the evaluation of three key ingredients entering the TMD factorization formula: the quasi-TMD PDF, the Collins–Soper kernel, and the reduced soft function. We employ three $N_f = 2+1+1$ twisted-mass fermion ensembles, including an ensemble at the physical pion mass. Our study relies on matrix elements of asymmetric staple-shaped quark bilinear operators and includes a nonperturbative renormalization analysis using two complementary schemes.

**Authors:** SEN, Aniket; ALEXANDROU, Constantia; STEFFENS, Fernanda; Dr SPANOUDES, Gregoris (University of Cyprus); Mr TARELLO, Jacopo (The Cyprus Institute); CICHY, Krzysztof; Prof. CONSTANTINOU, Martha; Dr BACCHIO, Simone (The Cyprus Institute)

**Presenter:** Dr SPANOUDES, Gregoris (University of Cyprus)

**Session Classification:** Session

Contribution ID: **8** Type: **not specified**

# Nucleon axial, tensor, and scalar charges and $\sigma$-terms in lattice QCD

*Wednesday, 25 February 2026 12:00 (30 minutes)*

We present results for the nucleon axial, scalar, and tensor charges, as well as the nucleon $\sigma$-terms, using four twisted mass fermion ensembles at four lattice spacings, including one at a finer lattice spacing of $\sim 0.05$ fm. The masses of the degenerate up and down, strange, and charm quarks are tuned to approximately their physical values. We compute both isovector and isoscalar charges and their flavor decomposition, including disconnected contributions. Systematic uncertainties associated with excited-state contamination and the continuum extrapolation are assessed using the Akaike information criterion.

**Authors:** IONA, Christos (University of Cyprus & The Cyprus Institute); ALEXANDROU, Constantia; Dr BACCHIO, Simone (The Cyprus Institute); FINKENRATH, Jacob Friedrich; KOUTSOU, Giannis (The Cyprus Institutes); LI, Yan; Dr SPANOUDES, Gregoris (University of Cyprus)

**Presenter:** IONA, Christos (University of Cyprus & The Cyprus Institute)

**Session Classification:** Session

Contribution ID: **10** Type: **not specified**

# Kronos : Lattice QCD with Kokkos

*Thursday, 26 February 2026 15:00 (30 minutes)*

Status update on Kronos

**Author:** SEN, Aniket

**Presenter:** SEN, Aniket

**Session Classification:** Session

Contribution ID: **11** Type: **not specified**

# QED and LIBE

*Wednesday, 25 February 2026 16:30 (30 minutes)*

An update on the ongoing effort to compute QED corrections to isoQCD observables. We will discuss the general computational strategy, focusing on the scale setting and the observables proposed in the November proposal. Finally, we will give a brief update on the baryon-splitting program we already started.

**Author:** Dr EVANGELISTA, Antonio (University of Cyprus)

**Presenter:** Dr EVANGELISTA, Antonio (University of Cyprus)

**Session Classification:** Session

Contribution ID: **12** Type: **not specified**

# Discussion on QED and LIBE

*Wednesday, 25 February 2026 17:30 (30 minutes)*

**Presenter:** TANTALO, Nazario (Universita e INFN Roma Tor Vergata (IT))

**Session Classification:** Session

Contribution ID: **13** Type: **not specified**

# Discussion on inclusive for baryons

*Wednesday, 25 February 2026 11:00 (30 minutes)*

**Presenter:** Dr BACCHIO, Simone (The Cyprus Institute)

**Session Classification:** Session

Contribution ID: **14** Type: **not specified**

# Update on muon g-2

*Wednesday, 25 February 2026 15:30 (30 minutes)*

**Presenter:** GAGLIARDI, Giuseppe

**Session Classification:** Session

Contribution ID: **15** Type: **not specified**

# Radiative decay of Kaons and Charmonia

*Wednesday, 25 February 2026 14:30 (30 minutes)*

**Presenter:** SANFILIPPO, Francesco (INFN Roma Tre)

**Session Classification:** Session

Contribution ID: **16** Type: **not specified**

# Renormalization and Quark Masses

*Thursday, 26 February 2026 12:00 (30 minutes)*

**Presenter:** DI CARLO, Matteo (CERN)

**Session Classification:** Session

Contribution ID: **17** Type: **not specified**

# Additional comments by Roberto and Gregoris

*Thursday, 26 February 2026 12:30 (30 minutes)*

**Presenter:** FREZZOTTI, Roberto

**Session Classification:** Session

Contribution ID: **18** Type: **not specified**

# Discussion on Renormalization

*Thursday, 26 February 2026 13:00 (30 minutes)*

**Presenter:** Dr SPANOUDES, Gregoris (University of Cyprus)

**Session Classification:** Session

Contribution ID: **19** Type: **not specified**

# Status of Simulations

*Thursday, 26 February 2026 16:30 (30 minutes)*

TODO

**Presenter:** FINKENRATH, Jacob Friedrich

**Session Classification:** Session

Contribution ID: **20** Type: **not specified**

# Discussion on Simulations

*Thursday, 26 February 2026 17:00 (1 hour)*

**Presenter:** URBACH, Carsten (University of Bonn)

**Session Classification:** Session

Contribution ID: **21** Type: **not specified**

# Discussion on Software

*Thursday, 26 February 2026 15:30 (30 minutes)*

**Presenter:** KOSTRZEWA, Bartosz (HISKP, Theory, University of Bonn)

**Session Classification:** Session

Contribution ID: **22** Type: **not specified**

# PDF and GPDs

*Thursday, 26 February 2026 10:30 (30 minutes)*

**Presenter:** PIERINI, Gabriele (ETH Zuerich)

**Session Classification:** Session

Contribution ID: **23** Type: **not specified**

# ππ scattering

*Friday, 27 February 2026 10:00 (30 minutes)*

**Presenter:** Dr PAUL, Srijit (University of Mainz)

**Session Classification:** Session

Contribution ID: **24** Type: **not specified**

# Progress in the HLbL contribution

*Wednesday, 25 February 2026 15:00 (30 minutes)*

We present a lattice calculation of the Hadronic Light by Light (HLbL) contribution of the strange- and charm-quark connected contributions to the anomalous magnetic moment of the muon. We employ the gauge configurations generated by the Extended Twisted Mass Collaboration (ETMC) with $N_f = 2 + 1 + 1$ flavors of Wilson-clover twisted-mass quarks at four lattice spacings at the physical point.
We perform a careful check of the potential sources of systematic errors and implement an extrapolation to the continuum limit based on the data at lattice spacings $a \simeq 0.049, 0.057, 0.068, 0.080$˜fm (ensembles cB, cC, cD).
We also present our preliminary results of the light-quark contributions coming from the fully connected and (2+2) disconnected diagrams for the ensembles cB, cC.

**Presenter:** ROMITI, Simone

**Session Classification:** Session

Contribution ID: **25** Type: **not specified**

# Lattice 2027

*Friday, 27 February 2026 10:30 (30 minutes)*

**Presenter:** ALEXANDROU, Constantia

**Session Classification:** Session

Contribution ID: **26** Type: **not specified**

# Nucleon higher mellin moments

*Thursday, 26 February 2026 10:00 (30 minutes)*

**Presenter:** KUMMER, Christian (University of cyprus)

**Session Classification:** Session