

**Standard Model at the LHC
2021**

**SM@LHC
2021**

Report of Contributions

Contribution ID: 10

Type: **not specified**

Electroweak corrections to the angular coefficients of Z-boson production and decay at finite-pT

Wednesday 28 April 2021 17:00 (10 minutes)

The five dominant angular coefficients A_i parametrizing the Drell-Yan process in the Z-boson mass range is examined, differentially in the dilepton transverse momentum p_T . The corresponding Lam-Tung relation $A_0 - A_2$ was previously found at ATLAS and CMS to deviate from SM higher-order QCD corrections. We investigate if this discrepancy can be due to electroweak effects by calculating the fixed-order NLO electroweak corrections to these coefficients and the Lam-Tung relation. This is done by extrapolating to a full phase space coverage of calculations performed with a single lepton transverse momentum cut. The electroweak effects on the distributions are found to be small but not negligible in the low- p_T range. Two of the coefficients are found to be highly sensitive to electroweak parameters. The Lam-Tung relation is found to have a significant contribution in the low- p_T region from these electroweak corrections.

Authors: FREDERIX, Rikkert (Lund University); VITOS, Timea (Lund University)

Presenter: VITOS, Timea (Lund University)

Session Classification: YSF

Contribution ID: 11

Type: **not specified**

Parton-shower effects in Higgs production via Vector-Boson Fusion

Wednesday 28 April 2021 17:40 (10 minutes)

We present a systematic investigation of parton-shower and matching uncertainties of perturbative origin for Higgs-boson production via vector-boson fusion. To this end we employ different generators at next-to-leading order QCD accuracy matched with shower Monte Carlo programs, PYTHIA8, and HERWIG7, and a next-to-next-to-leading order QCD calculation.

We thoroughly analyse the intrinsic sources of uncertainty within each generator, and then compare predictions among the different tools using the respective recommended setups. Within typical vector-boson fusion cuts, the resulting uncertainties on observables that are accurate to next-to-leading order are at the 10% level for rates and even smaller for shapes. For observables sensitive to extra radiation effects, uncertainties of about 20% are found.

We furthermore show how a specific recoil scheme is needed when PYTHIA8 is employed, in order not to encounter unphysical enhancements for these observables.

We conclude that for vector-boson fusion processes an assessment of the uncertainties associated with an NLO+PS simulation at next-to-leading order matched to parton showers based only on the variation of renormalisation, factorisation and shower scales systematically underestimates their true size.

Authors: SCHELLER, Johannes (Eberhard Karls Universität Tübingen); ZARO, Marco (Università degli Studi e INFN Milano (IT)); Dr KARLBERG, Alexander (University of Oxford); JAGER, Barbara (University of Tübingen); PLATZER, Simon (University of Vienna (AT))

Presenter: SCHELLER, Johannes (Eberhard Karls Universität Tübingen)

Session Classification: YSF

Contribution ID: 13

Type: **not specified**

Probing Higgs self coupling at the future upgraded LHC

Wednesday 28 April 2021 17:20 (10 minutes)

A direct measurement of the Higgs self coupling is very crucial to understand the nature of electroweak symmetry breaking. This requires an observation of production of Higgs boson pair, which suffers from very low event rate even at the current LHC run. In our work, we study the prospects of observing the Higgs pair production at the high luminosity run of the 14 TeV LHC (HL-LHC) and also the proposed high energy upgrade of the LHC at 27 TeV, namely, HE-LHC. For the HL-LHC study, we choose multiple final states based on the event rate and cleanliness, namely, $b\bar{b}\gamma\gamma$, $b\bar{b}\tau^+\tau^-$, $b\bar{b}WW^*$, $WW^*\gamma\gamma$ and $4W$ channels and do a collider study by employing a cut-based as well as multivariate analyses using the Boosted Decision Tree (BDT) algorithm. In case of HE-LHC study, we select various di-Higgs final states based on their cleanliness and production rates, namely, $b\bar{b}\gamma\gamma$, $b\bar{b}\tau^+\tau^-$, $b\bar{b}WW^*$, $WW^*\gamma\gamma$, $b\bar{b}ZZ^*$ and $b\bar{b}\mu^+\mu^-$ channels. We adopt multivariate analyses using BDT algorithm, the XGBoost toolkit and Deep Neural Network (DNN) for the signal-background discrimination. Also, we perform a study on the ramifications of varying the self-coupling of Higgs boson from its Standard Model (SM) value. (arXiv: 1712.05346, 2006.11879)

Authors: Mr ADHIKARY, Amit (Centre for High Energy Physics, Indian Institute of Science, Bangalore 560012, India); Dr BANERJEE, Shankha (CERN, Theoretical Physics Department, CH-1211 Geneva 23, Switzerland); Dr BARMAN, Rahool Kumar (Department of Physics, Oklahoma State University, Stillwater, Oklahoma, 74078, USA); Dr BHATTACHERJEE, Biplob (Centre for High Energy Physics, Indian Institute of Science, Bangalore 560012, India); Dr NIYOGI, Saurabh (Gokhale Memorial Girls' College, 1/1, Harish Mukherjee Road, Kolkata 700020, India)

Presenter: Mr ADHIKARY, Amit (Centre for High Energy Physics, Indian Institute of Science, Bangalore 560012, India)

Session Classification: YSF

Contribution ID: 14

Type: **not specified**

The anomalous Zbb couplings: From LEP to LHC

Wednesday 28 April 2021 18:00 (10 minutes)

The bottom quark forward-backward asymmetry (A_{FB}^b) data at LEP exhibits a long-standing discrepancy with the standard model prediction. We propose a novel method to probe the Zbb interactions through $gg \rightarrow Zh$ production at the LHC, which is sensitive to the axial-vector component of the Zbb couplings. We demonstrate that the Zh data collected at the 13 TeV LHC can already resolve the apparent degeneracy of the anomalous Zbb couplings implied by the LEP precision electroweak measurements, with a strong dependence on the observed distribution of the Z boson transverse momentum. We also show the potential of the HL-LHC to either verify or exclude the anomalous Zbb couplings observed at LEP through measuring the Zh production rate at the HL-LHC, and this conclusion is not sensitive to possible new physics contribution induced by top quark or Higgs boson anomalous couplings in the loop.

Author: Dr YAN, Bin (Los Alamos National Laboratory)

Co-author: Prof. YUAN, C.-P. (MSU)

Presenter: Dr YAN, Bin (Los Alamos National Laboratory)

Session Classification: YSF

Contribution ID: 19

Type: **not specified**

Triboson Measurements in CMS

Wednesday 28 April 2021 18:30 (10 minutes)

We present recent measurements of triboson processes from the CMS experiment at the LHC. Studies of the rare production of three vector bosons constitute a stringent test of the electroweak sector of the Standard Model, and can be used to probe new physics beyond the energy reach of the LHC. We present the first observation of three massive vector bosons and a search for the production of a W or Z boson in association with two photons.

Presenter: DA ROLD, Alessandro (Universita e INFN Trieste (IT))

Session Classification: YSF

Contribution ID: 25

Type: **not specified**

Measurement of Higgs to WW in association with a vector boson using the full Run 2 dataset at CMS

Wednesday 28 April 2021 17:30 (10 minutes)

In 2012, the observation of the Higgs Boson was announced by the CMS and ATLAS experiments at CERN. Since the discovery, work has continued to measure the Higgs boson couplings and quantum numbers with greater precision. There are several production channels of the Higgs boson and we are searching for the production of the Higgs boson in association with a vector boson in the $H \rightarrow WW$ decay channel with the CMS experiment at the LHC. This measurement provides a direct probe of the Higgs boson coupling to vector bosons. The latest CMS results on the Higgs boson decay to a W boson pair are presented. The focus of the presentation will be on the inclusive measurements performed for the VH leptonic channel with full Run 2 data which corresponds to an integrated luminosity of 137.1 fb⁻¹, collected by the CMS detector at LHC, as well as the constraints on the Higgs boson couplings to fermions and vector bosons arising from the simultaneous measurement of different production mechanisms.

Presenter: KAUR, Amandeep (Panjab University (IN))

Session Classification: YSF

Contribution ID: 27

Type: **not specified**

Observation of electroweak production of two jets and a Z-boson pair with the ATLAS detector at the LHC

Wednesday 28 April 2021 17:50 (10 minutes)

The observation of electroweak production of two jets in association with a Z- boson pair using 139 fb⁻¹ of pp collision data at $\sqrt{s} = 13$ TeV collected by the ATLAS detector at the LHC is reported. Two different final states originating from the decays of the Z boson pair, 4l and 2l2v, are included in the measurements. A significant data excess from the background-only hypothesis is observed, which corresponds to a statistical significance of 5.5σ . The observed excess is compatible with the electroweak production of two jets in association with a Z-boson pair in vector-boson scattering processes. The cross-sections for inclusive production of ZZ plus two jets, as well as the observed signal strength of the EW production, are presented.

Presenter: ZHANG, Shuzhou (University of Michigan (US))

Session Classification: YSF

Contribution ID: 28

Type: **not specified**

Measurement of the vector-boson transverse momentum distributions with ATLAS

Wednesday 28 April 2021 17:10 (10 minutes)

The transverse momentum distribution of W/Z bosons produced in hadronic collisions is a traditional probe of strong interaction dynamics. The correct modelling of this distribution is important in many physics analyses at the LHC for which the production of W or Z bosons constitutes a significant background. Moreover, it is crucial for a precise measurement of the W boson mass. In this talk measurements of the transverse momentum distribution for a Z decaying into an electron or muon pair together with the distribution of an angular variable based on the direction of the two leptons coming from the Z-boson decay are presented. The measurement is done using proton-proton collision data at $\sqrt{s}=13$ TeV collected with the ATLAS detector. The results are compared to perturbative and resummed QCD calculations and used to constrain the parton shower parameters of Monte Carlo generators. If available a measurement of transverse momentum distributions for W decaying into an electron or muon and a neutrino is also presented.

Presenter: PUDZHA, Dennis (NRC Kurchatov Institute PNPI (RU))

Session Classification: YSF

Contribution ID: 29

Type: **not specified**

NNLO QCD Predictions for Triphoton Production

Wednesday 28 April 2021 18:20 (10 minutes)

In this talk, I am going to present fully-differential NNLO QCD corrections to the hadroproduction of three isolated photons. We employ an implementation of the q_T subtraction formalism within Matrix, and the recent analytic computation of the two-loop amplitudes to achieve a fully-flexible calculation of the triphoton production at NNLO accuracy. This process is on the cutting edge of the NNLO multiplicity frontier, being the first $2 \rightarrow 3$ process for which NNLO QCD predictions have been calculated. We show that the large NNLO QCD corrections are indispensable to describe the experimental measurements in the broad spectrum of observables. We also discuss perturbative convergence of the fixed-order predictions.

Authors: KALLWEIT, Stefan (Universita & INFN, Milano-Bicocca (IT)); Dr SOTNIKOV, Vasily (Max Planck Institute for Physics); WIESEMANN, Marius (Max-Planck-Institut fur Physik (DE))

Presenter: Dr SOTNIKOV, Vasily (Max Planck Institute for Physics)

Session Classification: YSF

Contribution ID: 35

Type: **not specified**

LHCb: Search for CP violation in $D^0 \rightarrow K_S^0 K_S^0$ decays

Wednesday 28 April 2021 18:10 (10 minutes)

CP violation in the charm system has been observed for the first time by LHCb in 2019. Up to now, the effect has only been seen in a single observable, the Delta-ACP between $D^0 \rightarrow KK/\pi\pi$. Further measurements are therefore important for a better understanding of the physics picture in this novel field, and whether it is purely Standard-Model or not. Among the possible decay channels, the $D^0 \rightarrow K_S^0 K_S^0$ one is very promising for a second observation, having the potential for a CP asymmetry of up to $\sim 1\%$ in the SM. This channel is much more difficult to pursue at LHCb than its charged analogues, but thanks to recent improvement in the analysis, a measurement of its CP asymmetry on the Run-2 sample has just been completed, that is more precise than all previous measurements combined. We present the current result and the prospects for future LHCb runs.

Authors: TUCI, Giulia (Universita & INFN Pisa (IT)); RICCIARDI, Stefania (Science and Technology Facilities Council STFC (GB))

Presenter: TUCI, Giulia (Universita & INFN Pisa (IT))

Session Classification: YSF

Contribution ID: 36

Type: **not specified**

Hot topics in PDF fits (role of jet and top data, higher-orders, modelling of experimental correlations)

Monday 26 April 2021 14:00 (20 minutes)

Presenter: NOCERA, Emanuele Roberto (The University of Edinburgh)

Session Classification: QCD

Contribution ID: 37

Type: **not specified**

Recent results in NNLO and N3LO calculations

Monday 26 April 2021 14:20 (20 minutes)

Presenter: CAOLA, Fabrizio (University of Oxford)

Session Classification: QCD

Contribution ID: **38**

Type: **not specified**

Jet measurements (including Lund-plane) and PDF/ α_S interpretations at the LHC

Monday 26 April 2021 14:40 (20 minutes)

Presenter: DELSART, Pierre Antoine (LPSC/CNRS (Grenoble, FR))

Session Classification: QCD

Contribution ID: 39

Type: **not specified**

Jet Fragmentation and Central Exclusive Production at LHCb

Monday 26 April 2021 15:00 (15 minutes)

Presenter: MATTIOLI, Kara (University of Michigan (US))

Session Classification: QCD

Contribution ID: 40

Type: **not specified**

Progress in MC event generators (with focus on NLL showers)

Monday 26 April 2021 15:30 (20 minutes)

Presenter: PRESTEL, Stefan

Session Classification: QCD

Contribution ID: 41

Type: **not specified**

Role of mass corrections in pQCD calculations

Monday 26 April 2021 15:50 (15 minutes)

Presenter: NAPOLETANO, Davide (Universita & INFN, Milano-Bicocca (IT))

Session Classification: QCD

Contribution ID: 42

Type: **not specified**

Jet substructure (with possible ML) at the LHC

Monday 26 April 2021 16:05 (15 minutes)

Presenter: GOMEZ ESPINOSA, Alejandro (ETH Zurich (CH))

Session Classification: QCD

Contribution ID: 43

Type: **not specified**

On the treatment of correlated theoretical uncertainties in LHC data analysis

Monday 26 April 2021 16:20 (25 minutes)

Presenter: POZZORINI, Stefano Augusto (Universitaet Zuerich (CH))

Session Classification: Joint QCD - EWK

Contribution ID: 44

Type: **not specified**

State of the art in SM Higgs physics

Monday 26 April 2021 17:00 (25 minutes)

Presenter: MELNIKOV, Kirill (Karlsruhe Institute of Technology, Germany)

Session Classification: Higgs

Contribution ID: 45

Type: **not specified**

Higgs Couplings and properties (incl. mass, CP): current status

Monday 26 April 2021 17:25 (25 minutes)

Presenter: MURRONE, Alessia (Università degli Studi e INFN Milano (IT))

Session Classification: Higgs

Contribution ID: 46

Type: **not specified**

Resonant and non-resonant HH channel

Monday 26 April 2021 17:50 (25 minutes)

Presenter: MONTI, Fabio (Chinese Academy of Sciences (CN))

Session Classification: Higgs

Contribution ID: 47

Type: **not specified**

Progress in ttbar@NNLO+PS

Tuesday 27 April 2021 14:00 (30 minutes)

Presenter: WIESEMANN, Marius (Max-Planck-Institut für Physik (DE))

Session Classification: TOP

Contribution ID: 48

Type: **not specified**

ATLAS and CMS results latest results on $t\bar{t}$ and single-top cross-section measurements

Tuesday 27 April 2021 14:30 (35 minutes)

Presenter: OWEN, Mark Andrew (University of Glasgow (GB))

Session Classification: TOP

Contribution ID: 49

Type: **not specified**

ATLAS/CMS Top properties (mass, spin corr., asymm. V_{tb} ,...)

Tuesday 27 April 2021 15:20 (35 minutes)

Presenter: MITRA, Soureek (KIT - Karlsruhe Institute of Technology (DE))

Session Classification: TOP

Contribution ID: 50

Type: **not specified**

Higgs and flavour

Tuesday 27 April 2021 15:55 (25 minutes)

Presenter: GRELJO, Admir (Universitaet Bern (CH))

Session Classification: Higgs

Contribution ID: 51

Type: **not specified**

Rare SM Higgs channels (mumu, Zgamma, ccbar)

Tuesday 27 April 2021 16:20 (25 minutes)

Presenter: DONATO, Silvio (Universita & INFN Pisa (IT))

Session Classification: Higgs

Contribution ID: 52

Type: **not specified**

ATLAS/CMS latest results on $t(t)+X$ ($X=tt,bb,Z,W,\text{gamma}$)

Tuesday 27 April 2021 17:00 (25 minutes)

Presenter: PALENCIA CORTEZON, Jose Enrique (Universidad de Oviedo (ES))

Session Classification: Joint Top - Higgs

Contribution ID: 53

Type: **not specified**

ATLAS and CMS results latest results on tth/th

Tuesday 27 April 2021 17:25 (25 minutes)

Presenter: STREBLER, Thomas (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Session Classification: Joint Top - Higgs

Contribution ID: 54

Type: **not specified**

$t\bar{t}+X$ ($X=H,t\bar{t},b\bar{b},Z,W,\gamma$): status and perspectives of precision predictions

Tuesday 27 April 2021 17:50 (25 minutes)

Presenter: PAGANI, Davide (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Joint Top - Higgs

Contribution ID: 55

Type: **not specified**

New results on $b \rightarrow s \ell \ell$

Wednesday 28 April 2021 14:00 (20 minutes)

Presenter: KRETZSCHMAR, Sophie (Rheinisch Westfaelische Tech. Hoch. (DE))

Session Classification: FLV

Contribution ID: 56

Type: **not specified**

NP implications & connections with high-pT

Wednesday 28 April 2021 14:40 (20 minutes)

Presenter: MARZOCCA, David (INFN Trieste)

Session Classification: FLV

Contribution ID: 57

Type: **not specified**

CMS/ATLAS rare decays: new results & prospects

Wednesday 28 April 2021 14:20 (20 minutes)

Presenter: GALLONI, Camilla (University of Wisconsin Madison (US))

Session Classification: FLV

Contribution ID: 58

Type: **not specified**

Progress in NLO EW Monte Carlo

Wednesday 28 April 2021 15:30 (20 minutes)

Presenter: ZARO, Marco (Università degli Studi e INFN Milano (IT))

Session Classification: EWK

Contribution ID: 59

Type: **not specified**

Electroweak corrections for precision weak mixing angle measurements at LHC

Wednesday 28 April 2021 15:50 (20 minutes)

Presenter: CHIESA, Mauro (University of Pavia)

Session Classification: EWK

Contribution ID: **60**

Type: **not specified**

Drell-Yan measurements / weak mixing angle

Wednesday 28 April 2021 16:10 (18 minutes)

Presenter: KWAN, Tony (McGill University, (CA))

Session Classification: EWK

Contribution ID: **61**

Type: **not specified**

Multiboson measurements

Wednesday 28 April 2021 16:28 (18 minutes)

Presenter: DI PETRILLO, Karri Folan (Fermi National Accelerator Lab. (US))

Session Classification: EWK

Contribution ID: **62**

Type: **not specified**

Lattice QCD inputs for SM

Thursday 29 April 2021 14:00 (20 minutes)

Presenter: EL-KHADRA, Aida (UIUC)

Session Classification: FLV

Contribution ID: **63**

Type: **not specified**

Analytic QCD inputs for SM

Thursday 29 April 2021 14:20 (15 minutes)

Presenter: GUBERNARI, Nico (Universität Siegen)

Session Classification: FLV

Contribution ID: **64**

Type: **not specified**

CKM measurements and hadronic form factors

Thursday 29 April 2021 14:45 (15 minutes)

Presenter: BRAUN, Svende Annelies (University of Maryland (US))

Session Classification: FLV

Contribution ID: 65

Type: **not specified**

ATLAS and CMS results on CP-Violation: new results & prospects

Thursday 29 April 2021 15:00 (15 minutes)

Presenter: NOVOTNY, Radek (University of New Mexico (US))

Session Classification: FLV

Contribution ID: **66**

Type: **not specified**

Latest results on spectroscopy

Thursday 29 April 2021 15:35 (20 minutes)

Presenter: DI FLORIO, Adriano (Universita e INFN, Bari (IT))

Session Classification: FLV

Contribution ID: 67

Type: **not specified**

Status of theory predictions for single bosons, diboson, and multiboson production

Thursday 29 April 2021 15:55 (25 minutes)

Presenter: LINDERT, Jonas (University of Sussex)

Session Classification: Joint QCD - EWK

Contribution ID: **68**

Type: **not specified**

Differential cross section measurements of WW + 1 or more jets with ATLAS

Thursday 29 April 2021 16:20 (13 minutes)

Presenter: KUECHLER, Jan (Deutsches Elektronen-Synchrotron (DE))

Session Classification: Joint QCD - EWK

Contribution ID: 69

Type: **not specified**

Electroweak production of $Z\gamma$ and two jets at 13 TeV and constraints on EFTs

Thursday 29 April 2021 16:33 (13 minutes)

Presenter: Ms AN, Ying (Peking University (CN))

Session Classification: Joint QCD - EWK

Contribution ID: 70

Type: **not specified**

STXS vs. Fully fiducial measurements: limitations and possible future improvements

Thursday 29 April 2021 17:01 (25 minutes)

Presenter: BERGER, Nicolas (Centre National de la Recherche Scientifique (FR))

Session Classification: Higgs

Contribution ID: 71

Type: **not specified**

Differential Higgs measurements

Thursday 29 April 2021 17:26 (25 minutes)

Presenter: LUCIO ALVES, Fabio Lucio (Nanjing University (CN))

Session Classification: Higgs

Contribution ID: 72

Type: **not specified**

BSM Higgs

Thursday 29 April 2021 17:51 (25 minutes)

Presenter: ZIVKOVIC, Lidija (Institute of physics Belgrade (RS))

Session Classification: Higgs

Contribution ID: 73

Type: **not specified**

QCD & MC challenges for VBF/VBS measurements

Friday 30 April 2021 14:00 (25 minutes)

Presenter: PLATZER, Simon (University of Vienna (AT))

Session Classification: Joint QCD - EWK

Contribution ID: 74

Type: **not specified**

VBS/VBF Boson measurements

Friday 30 April 2021 14:25 (25 minutes)

Presenter: VALSECCHI, Davide (Università degli Studi e INFN Milano-Bicocca (IT))

Session Classification: Joint QCD - EWK

Contribution ID: 75

Type: **not specified**

Recent EFT developments: what we should be doing and why

Friday 30 April 2021 14:50 (25 minutes)

Presenter: RIVA, Francesco

Session Classification: EFT

Contribution ID: 76

Type: **not specified**

Top plus Higgs: towards a global EFT fit

Friday 30 April 2021 15:30 (25 minutes)

Presenter: VRYONIDOU, Eleni (University of Manchester (GB))

Session Classification: EFT

Contribution ID: 77

Type: **not specified**

The global impact of EW+H SMEFT probe

Friday 30 April 2021 15:55 (20 minutes)

Presenter: BRIVIO, Ilaria (University of Heidelberg)

Session Classification: EFT

Contribution ID: 78

Type: **not specified**

EFT measurements in the EW (+Higgs) sector

Friday 30 April 2021 16:15 (20 minutes)

Presenter: CALVET, Thomas (CPPM, Aix-Marseille Université, CNRS/IN2P3 (FR))

Session Classification: EFT

Contribution ID: 79

Type: **not specified**

EFT measurements in the top +Higgs sector

Friday 30 April 2021 16:35 (20 minutes)

Presenter: SAGGIO, Alessia (Deutsches Elektronen-Synchrotron (DE))

Session Classification: EFT

Contribution ID: **80**

Type: **not specified**

The PDF and EFT Interplay

Friday 30 April 2021 17:10 (20 minutes)

Presenter: UBIALI, Maria

Session Classification: EFT

Contribution ID: **81**

Type: **not specified**

Low energy and flavour EFT probes

Friday 30 April 2021 17:30 (20 minutes)

Presenter: VALLI, Mauro (University of California, Irvine)

Session Classification: EFT

Contribution ID: **82**

Type: **not specified**

EFT constraints with multi-dimensional and multi-variate techniques

Friday 30 April 2021 17:50 (20 minutes)

Presenter: BANERJEE, Shankha (CERN)

Session Classification: EFT

Contribution ID: **83**

Type: **not specified**

Combined discussion

Wednesday 28 April 2021 15:00 (15 minutes)

Session Classification: FLV

Contribution ID: **84**

Type: **not specified**

Combined TH discussion

Thursday 29 April 2021 14:35 (10 minutes)

Session Classification: FLV

Contribution ID: 85

Type: **not specified**

Combined EXP discussion

Thursday 29 April 2021 15:15 (5 minutes)

Session Classification: FLV