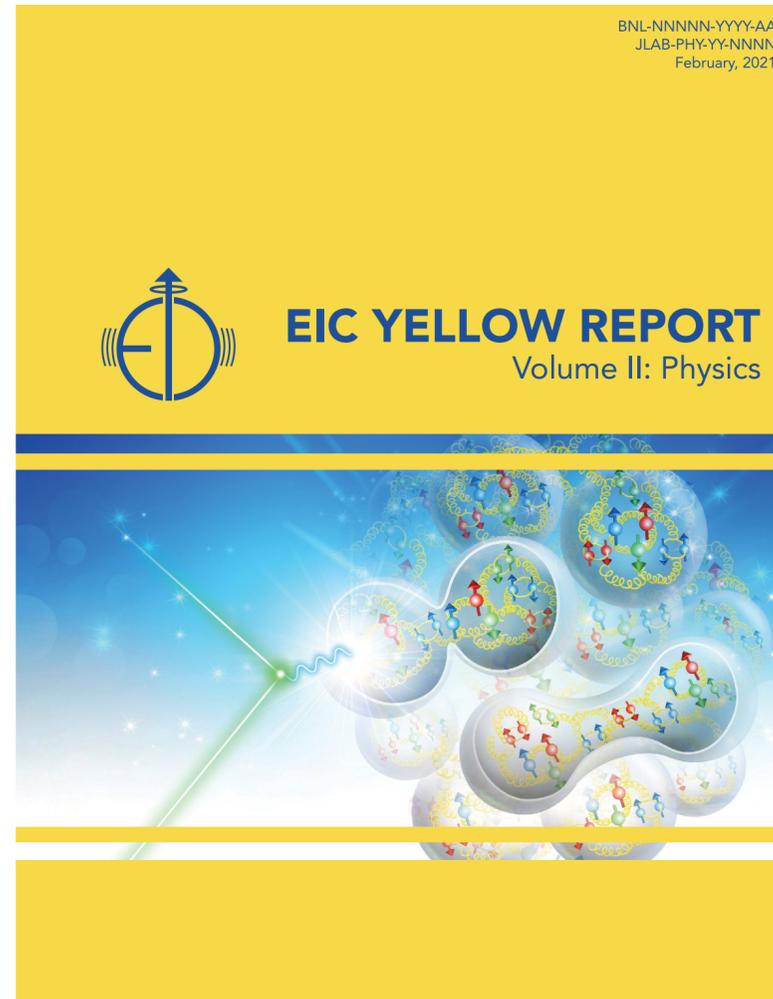


CFNS in EICUG Yellow Report 2020



Thomas Ullrich
CFNS Annual Review
February 2, 2021



Yellow Report Initiative

Purpose:

- Advance state of physics studies and detector concepts in preparation for the EIC.
- Provide the basis for further development of concepts for experimental equipment best suited to the EIC science needs, including complementarity of the two detectors
- Input towards future Technical Design Reports (TDRs) of the experimental equipment.
- Expect that community engagement, based on common interest, naturally evolves into proto-collaboration formation
- Results to be summarized in a “Yellow Report”*

* Name originate from CERN Yellow Reports series providing a medium for material having a large impact on the future, have a large audience and long duration of interest. The term is now used frequently for documents with similar purpose in various physics communities unrelated to CERN.

Yellow Report Initiative

Strategy:

- Quantify physics measurements for existing or new physics topics and implications for detector design (“**Physics Group**”)
- Physics considerations for two independent complementary detectors
- Study detector concepts based on the requirements defined above, and quantify implications for the physics measurements (“**Detector Group**”)

Approach:

- Two WG: **Physics** requirement & **Detector** concepts - 4 conveners each
- Several sub-groups each, 1-4 conveners/sub-group
- Time limited effort: ~1 year
- The report will be written at the expert level
- Oversight by EICUG Steering Committee (Planning R. Ent & TU)

Yellow Report Initiative

Audience:

- The main audience of the Yellow Report is the EIC community itself
- The report intends to reflect the consensus view of the user group on what requirements EIC detectors have to meet and what detector technologies and concepts to deploy

Meetings:

- December 12-13, 2019, MIT: Kick-off/planning/organization meeting
- Workshops
 - ▶ March 19-21, 2020, Temple University, Philadelphia (remote)
 - ▶ May 20-22, 2020, Trieste, Italy (remote)
 - ▶ September 16-18, 2020, CUA, Washington D.C. (remote)
 - ▶ November 19-21, 2020, UCB/LBL, Berkeley, CA (remote)

Yellow Report Organization - Physics WG

Convener of PWG:

- Adrian Dumitru (Baruch), Olga Evdokimov (UIC), Andreas Metz (Temple), Carlos Muñoz Camacho (Orsay)

Convener of Subgroups:

- Inclusive Reactions: Renee Fatemi (Kentucky), Nobuo Sato (JLab), **Barak Schmookler** (Stony Brook)
- Semi-inclusive Reactions: Ralf Seidl (RIKEN), Justin Stevens (W&M), Alexey Vladimirov (Regensburg), Anselm Vossen (Duke), Bowen Xiao (CCNU, China)
- Jets, Heavy Quarks: Leticia Mendez (ORNL), **Brian Page** (BNL), Frank Petriello (ANL & Northwestern U.), Ernst Sichtermann (LBL), Ivan Vitev (LANL)
- Exclusive Reactions: Raphaël Dupré (Orsay), **Salvatore Fazio** (BNL), Tuomas Lappi (Jyvaskyla), Barbara Pasquini (Pavia), Daria Sokhan (Glasgow)
- Diffractive Reactions & Tagging: Wim Cosyn (Florida), Or Hen (MIT), Doug Higinbotham (JLab), Spencer Klein (LBNL), Anna Stasto (PSU)

Red: CFNS affiliation/member

Yellow Report Organization - Detector WG

Convener:

- Ken Barish (UC Riverside), Tanja Horn (CUA), Peter Jones (Birmingham), Silvia Dalla Torre (Trieste)

Convener of Subgroups:

- Tracking/Vertexing: Kondo Gnanvo (UVA), Leo Greiner (LBNL), Domenico Elia (INFN)
- Particle ID: **Tom Hemmick** (SBU), Patrizia Rossi (JLab)
- Calorimetry: Vladimir Berdnikov (CUA), Eugene Chudakov (JLab)
- Far-Forward Detectors: Alexander Jentsch (BNL), Michael Murray (Kansas)
- DAQ/Electronics: Andrea Celentano (INFN), Damien Neyret (CEA Saclay)
- Polarimetry/Ancillary Detectors: Elke Aschenauer, Dave Gaskell
- Central Detector/Integration & Magnet, Conveners: William Brooks, **Alexander Kiselev** (BNL)
- Forward Detector/IR Integration: Yulia Furletova (JLab)
- Detector Complementarity: Elke Aschenauer (BNL), Paul Newman (Birmingham)

Red: CFNS affiliation/member

Strong CFNS Participation in the Yellow Report

Active Participants:

- Barak Schmookler (Inclusive reactions, exclusive/tagging)
- Brian Page (Jets, heavy quarks)
- Salvatore Fazio (Exclusive reactions)
- Tom Hemmick (Particle ID)
- Z. Tu (Kong) (SRC studies, diffraction)
- Kolja Kauder (Computing/simulations: eicsim)
- J.D. Brandenburg (Tracking and related detector technology)
- Jinlong Zhang (Inclusive (EW) and SIDIS (Λ pol.) processes)
- Prakhar Garg (PID - RICH, HBD, LSD, Tracking - TPC)
- Mriganka Mouli Mondal (Jet substructure)
- Yang Ting Chien (Jet studies, hadronization)
- Sanghwa Park (PID (software), Inclusive (EW))
- Raju Venugopalan (Connection to NS)
- TU (Exec. Summary, R&D & Detector Chapters, Coordination)
- Dima Kharzeev (SRC correlations)
- Abhay Deshpande (Jet studies, EW/BSM)
- Yoshitaka Hata (DVCS, Wigner, exclusive reaction)
- Ciprian Gal (Polarimetry)
- George Sterman (Jet studies)
- Jan C. Bernauer (Streaming readout)
- Klaus Dehmelt (Tracking)
- Jin Huang (DAQ, Streaming readout)
- Björn Schenke (Exclusive reactions, diffraction)
- Krishna S. Kumar (EW/BSM)

CFNS Workshops Related to Yellow Report

Workshops

- January 21-24, 2020 - *Exploring QCD with light nuclei at EIC*
- May 6-7, 2020 - *Electroweak Physics at the EIC*
- June 1-5, 2020 - *Pion and Kaon Structure Function at the EIC*
- June 26, 29 & July 1, 2020 - *Beam Polarization and Polarimetry at the EIC*
- July 9-10, 2020 - *Radiative Corrections*
- September 28-30, 2020 - *Target Fragmentation Physics with EIC*
- November 4-6, 2020 - *Opportunities with Heavy Flavor at the EIC*
- December 15-16, 2020 - *Pre-meeting for the 2nd IR workshops in 2021*

... and many stimulation seminars

Yellow Report - Status and Next Steps

Status:

- Mature draft: 3 Volumes, 833 Pages by 331 authors from 147 institutions
- January 31 was deadline for comments from “external” reviewers.
- February 1 - February 15
 - ▶ Final editing of Yellow Report(s) to fold in reader comments
- February 22
 - ▶ Release of Yellow Report(s) including putting on arXiv

Next Steps:

- Keep momentum, many WG want to go on \Rightarrow opportunities for CFNS in supporting role
- March 1, 2021: “Call for Proposal” expected
- Spring 2021: Formation of EIC collaboration(s) \Rightarrow opportunities for CFNS in supporting role

Take Away Message

- Yellow Report is an important step towards the realization of EIC detectors
 - ▶ Physics requirements
 - ▶ Detector concepts & technologies
 - ▶ Complementary of 2 detectors
- CFNS played an important role in this process
 - ▶ Conveners and sub-conveners
 - ▶ Active participants on a broad range of topics in physics and detectors
 - ▶ Important topical workshops to supplement YR workshops in 2020
- 2021 will be a key year for the EIC
 - ▶ CD-1, Forming of collaborations, detector proposals
 - ▶ CFNS can and should play a big role in this process