

# Snowmass EF03 meeting

## Heavy flavor and top quark physics

### Introduction

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# How to get involved

- Join our email list by emailing to [listserv@fnal.gov](mailto:listserv@fnal.gov) and keep the subject line blank and type in the body:
- SUBSCRIBE SNOWMASS-EF-03-TOP\_HEAVY-FLAVOR@FNAL.GOV  
FIRSTNAME LASTNAME
- Email the conveners: [schwier@msu.edu](mailto:schwier@msu.edu), [dw24@buffalo.edu](mailto:dw24@buffalo.edu)
- Participate in/present at our meetings: see EF03 wiki page at [https://snowmass21.org/energy/heavy\\_flavour](https://snowmass21.org/energy/heavy_flavour)
- Informal list of projects, possible collaborations, open questions, etc.:
- <https://docs.google.com/document/d/17aPp9XpJAImmPInPNtgV21rG2zEiFS2IHkOooC4rcQ>
  - Anyone can edit!

# LOIs

- Thanks to everyone who submitted an LOI to EF03

## **Quark polarization measurements: from the Standard Model to characterizing New Physics**

Letter of Interest for Snowmass 2021

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Mario Galanti,<sup>1</sup> Andrea Giammanco,<sup>2</sup> Yuval Grossman,<sup>3</sup> Yevgeny Kats,<sup>4</sup> Emmanuel Stamou,<sup>5</sup> and Jure Zupan<sup>6</sup>

## LoI : Measurements of the top quark mass at the ILC\*

Esteban Fullana<sup>1</sup>, Juan Fuster<sup>1</sup>, Frank Simon<sup>2</sup>, and Marcel Vos<sup>1</sup>

## **Precise predictions for top-quark flavor-changing neutral interactions at future lepton colliders**

*Snowmass letter of intent*

Gauthier Durieux, Stefano Frixione, Benjamin Fuks, Hua-Sheng Shao, Liaoshan Shi, Marco Zaro, Cen Zhang, and Xiaoran Zhao

# EF03 LOIs continued

## **Top Quark and BSM Interactions at the HL-LHC and HE-LHC**

Andreas Jung\*

Department of Physics and Astronomy, Purdue University

Alexander Moreno Briceño†

Departamento de Física, Facultad de Ciencias, Universidad Antonio Nariño

## **Optimising top-quark pair-production threshold scan at the future $e^+e^-$ colliders**

Kacper Nowak<sup>a</sup> and Aleksander F. Żarnecki<sup>a</sup>

**LCC Physics Working Group**

## **Electroweak couplings of heavy and light quarks at future linear $e^+e^-$ colliders**

Letter of Interest for the Snowmass Study 2021  
Energy Frontier – Heavy flavor and top quark physics

Contact: Roman Pöschl\*, Marcel Vos†

# EF03 LOIs continued

*Probing top quark FCNC couplings  $tq\gamma, tqZ$  at future  $e^+e^-$  collider*

Peiwen Wu (School of Physics, Southeast University) [pwwu@seu.edu.cn]:

**A detailed comparison of QCD modelling in  $pp \rightarrow t\bar{t}W^\pm$  production\***

G. Bevilacqua,<sup>1</sup> H. Bi,<sup>2</sup> F. Febres-Cordero,<sup>3</sup> H.B. Hartanto,<sup>4</sup> M. Kraus,<sup>3</sup> J. Nasufi,<sup>2</sup> L. Reina,<sup>3</sup> and M. Worek<sup>2</sup>

*Top quark physics at FCC-ee*

**Authors:** J. Andrea<sup>1</sup>, P. Azzi<sup>2</sup>, B. Fuks<sup>3</sup>

**Snowmass Expression of Interest – bottom quark mass**

*Juan Fuster<sup>1</sup>, Adrián Irles<sup>1</sup>, Germán Rodrigo<sup>1</sup>, Seidai Tairafune<sup>2</sup>, Marcel Vos<sup>1</sup>, Hitoshi Yamamoto<sup>1,2</sup>, Ryo Yonamine<sup>2</sup>*

**Energy Peak and Its Implications on Collider Phenomenology:  
Top Quark Mass Determination and Beyond**

Kaustubh S. Agashe<sup>a</sup>, Roberto Franceschini<sup>b</sup>, and Doojin Kim<sup>c</sup>

# EF03 LOIs continued

Snowmass2021 LoI: **Constraining heavy flavor PDFs at hadron colliders**

**Authors in alphabetical order:** Marco Guzzi, Timothy Hobbs, Pavel Nadolsky, Laura Reina, Doreen Wackerath, Keping Xie, C.-P. Yuan

## **SNOWMASS 2020 LETTER OF INTEREST STUDY ON THE DISCOVERY POTENTIAL OF ALL-HADRONIC SEARCHES FOR TTBAR RESONANCES AT FUTURE COLLIDERS**

JOHAN S. BONILLA\*, ROBIN ERBACHER\*, CHRISTINE MCLEAN\*\*, MEG MORRIS\*\*,  
SALVATORE RAPPOCCIO\*\*, AC MALIK WILLIAMS\*\*

## **Probing High Scale Physics via Standard Model Parameters**

David Dunsky<sup>1,2</sup>, Lawrence J. Hall<sup>1,2</sup>, and Keisuke Harigaya<sup>3</sup>

**Gamma-gamma collider with  $W_{\gamma\gamma} \leq 12$  GeV based on the 17.5  
GeV SC linac of the European XFEL**

V. I. Telnov\*

# EF03 LOIs continued

## Electroweak Heavy Flavour (bottom, charm, tau) at the FCC-ee

*Letter of Interest submitted to Snowmass 2021*

Juan Alcaraz Maestre<sup>1</sup>, Patrizia Azzi<sup>2</sup>, Alain Blondel<sup>3</sup>, Mogens Dam<sup>4</sup>, Patrick Janot<sup>5</sup>, Stéphane Monteil<sup>6</sup>, and Guy Wilkinson<sup>7</sup>

## Gamma-gamma collider with $W_{\gamma\gamma} \leq 12$ GeV based on the 17.5 GeV SC linac of the European XFEL

V. I. Telnov\*

## Top-Quark and Electroweak Physics at LHeC and FCC-eh Future energy frontier electron-proton colliders

N. Armesto, O. Behnke, D. Britzger, O. Cakir, M. Klein, C. Schwanenberger, H. Spiessberger

# Detector or reconstruction LOIs that mention top and HF

- Top and bottom quarks are a challenge to reconstruct and identify

## **The IDEA Drift Chamber for a Lepton Collider**

Letter Of Interest for Snowmass 2021

F. Cuna<sup>1,2</sup>, N De Filippis<sup>3,4</sup>, W. Elmetenawee<sup>3,5</sup>, E. Gorini<sup>1,2</sup>, F. Grancagnolo<sup>\*1</sup>,  
I. Margjeka<sup>3,5</sup>, M. Panareo<sup>1,2</sup>, M. Primavera<sup>1</sup>, G.F Tassielli<sup>1</sup>, and A. Ventura<sup>1,2</sup>



# LOIs that are not for EF03

## *Testing Lepton Flavor Universality at Z pole*

*Searching for  $B_s \rightarrow \phi \nu \nu$  and other  $b \rightarrow s \nu \nu$  processes  
at CEPC*

Feasibility study of CP-violating Phase  $\phi_s$  measurement  
via  $B_s \rightarrow J/\Psi \phi$  channel at CEPC

## **Charged Lepton Flavour Violation at the FCC-ee**

**Tau lepton properties and lepton universality  
measurements at the FCC-ee**

# Upcoming meetings and workshop

- Virtual Snowmass Community Planning Meeting: ~4 days during the week of October 5th (Oct. 5-9), 2020, each day schedule with 9am-2pm PDT, 12pm-5pm EDT
  - Details TBD

# Today

- Top quark mass measurements and their interpretations
  - Presentation by Andre Hoang and discussion
- 5-minute presentations by groups on their plans