

The Strange Quark as a probe for new Physics in the Higgs Sector

Matt Basso (U. of Toronto)

Valentina Maria Martina Cairo (CERN)

On the Arxiv!

<https://arxiv.org/abs/2203.07535>

[Submitted on 14 Mar 2022]

Strange quark as a probe for new physics in the Higgs sector

Alexander Albert, Matthew J. Basso, Samuel K. Bright-Thonney, Valentina M. M. Cairo, Chris Damerell, Daniel Egana-Ugrinovic, Ulrich Heintz, Samuel Homiller, Shin-ichi Kawada, Jingyu Luo, Chester Mantel, Patrick Meade, Jose Monroy, Meenakshi Narain, Robert S. Orr, Joseph Reichert, Anders Ryd, Jan Strube, Dong Su, Ariel G. Schwartzman, Tomohiko Tanabe, Junping Tian, Emanuele Usai, Jerry Va'vra, Caterina Vernieri, Charles C. Young, Rui Zou

Also [ILD-PHYS-PROC-2022-001](#)



Paper Publication plans

- **ILD supports us moving forward to a paper publication**
- A few outstanding points that would need to be added:
 - 1. The additional polarization scenarios to be able to perform the analysis on the full 2000 fb-1 dataset.**

This is the most urgent item, and the sample production is ongoing. Since we have to produce miniDST again for this, it might also be a chance to actually include the proper dE/dx info now and study how it compares to our truth PID results. Uli is actually helping us with this.

On the wish list we also have:

2. Alternative network for Flavour Tagging (studies are ongoing)
3. $H \rightarrow cs$ analysis (studies have started on generating the events)

Agreed with ILD to wait until at least 1. is in place before initiating a new review process

FCC meeting

We presented our work during an [FCC Physics Workshop](#) in February 2022

As a follow up, a kick-off meeting has been called for this coming Monday

The goals of the meeting are:

FCC Higgs Kick-off meeting

 Monday 28 Mar 2022, 14:30 → 17:05 Europe/Zurich

- for the various contributors to introduce themselves to the group
- discuss the current status/plans of the existing efforts
- discuss possible common efforts (event selections, analysis/statistical tools, object definitions, ...)

To this end, we would like to ask everyone who already contributed to existing FCC-ee Higgs studies (or plan to), to prepare a small presentation (≤ 5 slides) to introduce themselves, summarise the status of the ongoing efforts (if any), and outline concrete plans for the near future. Please note that the next FCC week takes place in slightly more than 2 months.

A side note

Feb. 15th

Dear colleague

As you know a broad international discussion is ongoing on the best way to realize a Higgs factory as the future project in particle physics. A number of projects are being discussed, ILC of course, CLIC, FCC-ee, CEPC, others. In Europe ECFA has launched a study on the science capabilities of such a facility, similar efforts are underway in other regions of the world.

At the same time the Japanese government starting last year had organized a review of the ILC project as a project hosted in Japan. Preliminary conclusions indicate that Japan will not come forward with a bid to host ILC in the near future, and will currently not support the formation of a pre-lab as proposed about a year ago.

This new situation clearly poses questions to ILD as a collaboration which up to now had a strong focus on the ILC project.

After a discussion in the ILD management, and a presentation and discussion with the general ILD group we like to propose that ILD starts a strategy process to define its future in this changed world. There was a broad agreement by the people present in the recent ILD meeting, **that ILD as a group has a significant offer to make to the global effort towards an Higgs factory and that it is worth to re-direct the know-how and accumulated experience in ILD towards a broader community of people supporting electron positron colliders.** Being able to study the science capabilities of these facilities, to compare different options, and to do this in the context of a well-developed integrated detector concept is seen as a significant advantage and added value which ILD can deliver.

We therefore like to start a process in ILD to more clearly understand our position, to understand how we can move forward to become engaged in other collider projects not just ILC, and in general develop a view on the future development of ILD.

We will start this with a series of (virtual) ILD meetings, where we will look at ILD, its state, the different projects which are under discussion, and try to understand how ILD could be integrated into these concepts. The first of these meetings will be on Tuesday, March 1, at the slot of our regular ILD group meetings.

The results from these open meetings will then be combined by a strategy group consisting of the ET and the working group conveners into a strategy document for ILD, which will describe the future direction of ILD, including a work plan on how to proceed. We anticipate that the process will be finished early in summer 2022.

At the end of the process shall then be a plan, broadly discussed in ILD, which will then be formally endorsed by the institute assembly.

Please get in touch with us (ild-et@desy.de) if you want to make your opinion known, have a question, or have suggestions on how to shape the process.

Best regards, Ties

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March 1st: ILD Strategy discussion Part I: <https://agenda.linearcollider.org/event/9623/>

March 22nd: ILD Strategy discussion Part II: <https://agenda.linearcollider.org/event/9624/>


ECFA Seminar


ECFA Higgs Factory Seminar on April 8th

<https://indico.cern.ch/event/1138771/>

ECFA Higgs Factory seminars: Physics with light quarks

📅 Friday 8 Apr 2022, 14:00 → 15:35 Europe/Zurich

Videoconference  ECFA Higgs Factory Seminars ▶ Join ▾

- 14:00** → 14:15 **Opening & Introduction** ⌚ 15m
Speakers: Fabio Maltoni (Universite Catholique de Louvain (BE)), Jenny List (Deutsches Elektronen-Synchrotron (DE)), Jorge de Blas (Universidad de Granada (ES)), Juan Alcaraz Maestre (Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas (CIEMAT, Madrid))
- 14:15** → 14:40 **Physics with light quarks at Higgs factories** ⌚ 25m
Speaker: Yotam Soreq (Technion- Israel Institute of Technology (IL))
- 14:40** → 15:05 **Tagging strange quarks at Higgs factories** ⌚ 25m 
Speaker: Valentina Cairo (CERN)
- 15:05** → 15:35 **Discussion** ⌚ 30m

Please join the discussion!

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The topics I have on my list at the moment are the following:

ILD: Yuichi's ee->ss studies (<https://agenda.linearcollider.org/event/9514/#32-update-on-ee-ss>)

ILD but generally applicable: Us with H->ss & RICH (<https://arxiv.org/abs/2203.07535>)

FCC-ee: FTag with ParticleNet by Loukas and Michele
(<https://indico.cern.ch/event/1066234/contributions/4710423/>)

FCC-ee: Strange Tagging with CNNs by Eduardo
(<https://indico.cern.ch/event/1066234/contributions/4710424/>)

FCC-ee: PID via cluster counting by Franco (<https://indico.cern.ch/event/1066234/timetable/#157-a-beam-test-for-the-cluste>)

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Would it make sense to try
and have a comparison
between the current
network and ParticleNet
for us by the 8th?

1st ECFA Workshop on Higgs/Top/EW

<https://indico.cern.ch/event/1132480/>

ECFA workshops on e⁺e⁻ Higgs/Top/EW factory
European Committee for Future Accelerators

WG1: Higgs Top EW

1st Workshop of the Higgs/Top/EW group

20–22 Apr 2022
CERN
Europe/Zurich timezone

Enter your search term

Strange Quark as a probe for new physics in the Higgs sector



20 Apr 2022, 16:45

15m

500/1-001 - Main Auditorium (CERN)

Higgs

Higgs track

Wednesday sessions

Speakers

Matthew Basso (University of Toront..)

Snowmass Energy Frontier Workshop

Energy Frontier Workshop, March 28- April 1

<https://indico.fnal.gov/event/52465/>

(neither Matt nor I get to open the page)