

Subject: Re: [ild-physics-conveners] Presentation of FCNC analysis (t->cH)..
From: Aleksander Filip Zarnecki <Filip.Zarnecki@fuw.edu.pl>
Date: 03/01/2017 11:32 AM
To: Mikael Berggren <mikael.berggren@desy.de>

Dear Mikael,

Here are my answers to your poits:

1. The physics of your analysis

Search for FCNC decay of top quark: $t \rightarrow c H$
(currently limited to $H \rightarrow b\bar{b}$ channel)

2. current status of the analysis (starting - on going - close to final) ?

On going

3. level of ambition of the analysis (pure theory - simple 4-vector smearing - advanced 4-vector smearing (Delphes-level)-fastsim (SGV) - fullsim) ?

Full simulation

4. Requests for samples, signal/background

Simulation of dedicated signal sample required
(sample can be generated with new Whizard)

Access to full sample of events generated for tt analysis.

The problem is, that the vertexing and flavour tagging has to be repeated with the new LCFI+. So there are two problems:

- signal has to be generated in the setup consistent with that used to generate the background sample (tt and 6-fermion samples).
- I have not checked yet, if LCFI+ can be run on the old samples

5. LHC connection: not yet seen, but will be before ILC starts - might be seen after the full HiLumi LHC - No way LHC would see it. etc)

HL-LHC can probe this channel to $\sim 2 \cdot 10^{-4}$ which is close to the current estimate for hadronic channel at CLIC, at 380 GeV (see below).

I do hope that with improved analysis, combining hadronic and semileptonic channel, we can be better than that.

6- Any interest for ILC@250, or is ≥ 500 mandatory ?

Need to be above tt threshold

Additional information

Results on the parton level were completed in 2015, presented at TopLC'2015:

http://hep.fuw.edu.pl/u/zarnecki/talks/afz_toplc2015.pdf

Results based on full simulation for CLIC at 380 GeV (hadronic channel only) presented at LCWS'2016:

http://hep.fuw.edu.pl/u/zarnecki/talks/afz_lcws2016.pdf

Currently I am working on:

- improving 380 GeV analysis for CLIC by using selection based on BDT
- repeating the analysis for 500 GeV running (still with CLIC_ILD detector simulation)
- I have a student, who should address the semileptonic channel at 380 GeV, but the progress is very slow...

Regards
Filip

On Tue, 28 Feb 2017, Mikael Berggren wrote:

Dear Filip,

No worries. You don't need to prepare any slides, but you could just mail me a few bullet points along the lines of the six points below.

Best,

Mikael

Den 2017-02-28 kl. 09:02, skrev Aleksander Filip Zarnecki:

Dear Mikael,

Thank you very much for invitation. Unfortunately, I am invited to quite an important meeting with the Minister of Higher Education and Science at 3PM, so I will not be able to take part in the BSM meeting tomorrow. If you like, I can prepare few summary/status slides and you could present them. The results for 380 GeV are basically unchanged since LCWS'2016, but I started to work on two extensions: BDT bases signal selection and 500 GeV analysis. Should I prepare such a summary?

Regards
Filip

On Mon, 27 Feb 2017, Mikael Berggren wrote:

> Dear Filip,

> > We are having a meeting in the BSM sub-group now on Wednesday (14:00 > CET). It's a quick tour around the different analyses that are on-going > (see the enclosed mail). Maybe you could make a few slides along the > those lines, and present them at

that time? We then look forward to a > full presentation in the next BSM-focused ILD meeting, which - if I > count correctly - would be April 19!

> > Best,

> > Mikael

> > PS. I added you to the ILD-BSM mailing list, as well. I hope that's OK/M

> =====

> > Dear members of the BSM sub working group

> > We are planning to hold our first sub group meeting on Mar 1, 2017 (Wed)

> > at 14:00 DESY time.

> > An agenda page will be created soon with a lot for each one in this mailing list, as well as new members.

> > In this meeting, we would like to have , NOT details on analysis, but a very brief update including the following points:

> > 1. The physics of your analysis

> > 2. current status of the analysis (starting - on going - close to final) ?

> > 3. level of ambition of the analysis (pure theory - simple 4-vector

> > smearing - advanced 4-vector smearing (Delphes-level)-fastsim (SGV) - fullsim) ?

> > 4. Requests for samples, signal/background

> > 5- LHC connection: not yet seen, but will be before ILC starts - might be seen after the full HiLumi LHC - No way LHC would see it. etc)

> > 6- Any interest for ILC@250, or is ≥ 500 mandatory ?

> > Please contact us if you have any questions, or if you have any time slot preferences in the 1-2 hr session.

> > Best regards

> > Jackie and Mikael

> > > > > Den 2017-02-09 kl. 11:16, skrev Aleksander Filip Zarnecki:

> > > Dear physics conveners,

> > > I am working on the top FCNC decay analysis $t \rightarrow cH$. Currently I am focusing on detailed simulation for CLIC at 380 and 500 GeV, but results can probably be of interest for ILD as well. I promised to report on the analysis at the nearest BSM oriented meeting.

> > Unfortunately, as it was announced on Tuesday, the next "BSM day" is scheduled on March 8th. I will not be able to participate in the meeting as I take part in the CLIC workshop at CERN on that date.

> > Would it be possible to schedule my presentation at some other meeting? Maybe March 22 (Top/QCD) could do?

> > > Regards

> > > Filip Zarnecki

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