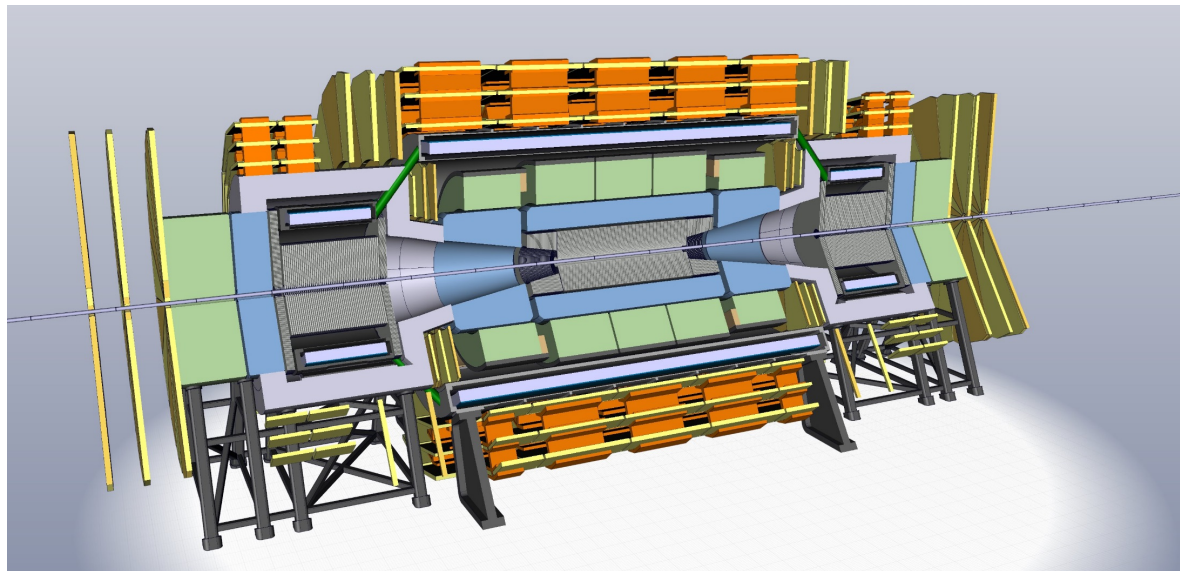


Introduction & News

Heather Gray, [Filip Moortgat](#)

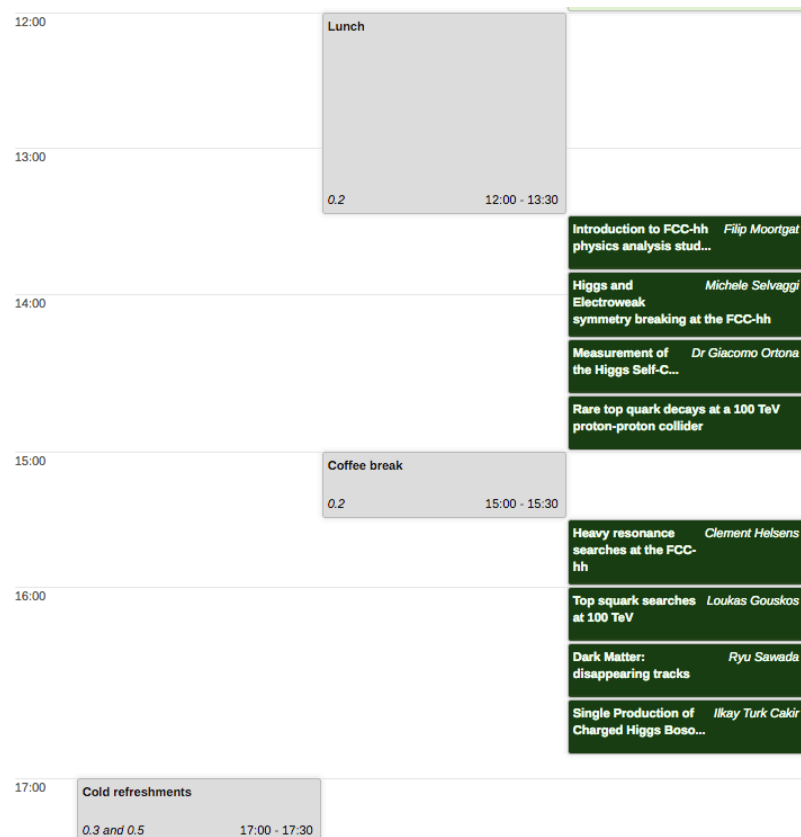


Today



Goal of today's meeting: preview the material that will be shown in the various presentations at the FCC week in Amsterdam.

Wednesday April 11th



Today's not meant to be an actual rehearsal – just going through the content of the talks.

CDR outline



FCC-hh Physics Benchmark Studies

1.1 Introduction

Heather Gray, Filip Moortgat

Discussion on physics motivation of the benchmark channels.

1.2 Higgs and Electroweak Symmetry Breaking

1.2.1 Higgs Properties

Responsible: Michele Selvaggi

1.2.1.1 $H \rightarrow ZZ$

1.2.1.2 $H \rightarrow \gamma\gamma$

1.2.1.3 $H \rightarrow Z\gamma$

1.2.1.4 $H \rightarrow \mu\mu$

1.2.2 $t\bar{t}H$ Production

Responsible: Michele Selvaggi, Valentin Volk, Clement Helsen

1.2.2.1 $t\bar{t}H, H \rightarrow \gamma\gamma$

1.2.2.2 $t\bar{t}H, H \rightarrow \text{multileptons}$

1.2.2.3 $t\bar{t}H, H \rightarrow bb$ (boosted) ?

1.2.3 Measurement of di-Higgs production

Responsible: Michele Selvaggi, Sylvie Braibant, Giacomo Ortona, Biagio Di Micco, Nicola De Filippis, *et al.*

1.2.3.1 $HH \rightarrow bb\gamma\gamma$

1.2.3.2 $HH \rightarrow bbWW / bbZZ$

1.2.3.4 $HH \rightarrow bb\tau\tau$

1.2.3.5 $HH \rightarrow bbbb$ (boosted)

1.2.4 Measurement of Vector Boson Scattering

Responsible: Andre Sznajder, *et al.*

1.3 Searches for new physics

1.3.1 Resonances: $ee, \mu\mu, jj$

Responsible: Clement Helsen, Michele Selvaggi

1.3.2 Resonances: $WW, t\bar{t}$

Responsible: Clement Helsen, Michele Selvaggi

1.3.3 Supersymmetry: stop search

Responsible: Loukas Gouskos

1.3.4 Dark Matter: monojet + DM, $t\bar{t}$ + DM, VBF + DM

Responsible: Phil Harris

1.3.5 Dark Matter: disappearing tracks

Responsible: Ryu Sawada, Koji Terashi, Masahiko Saito

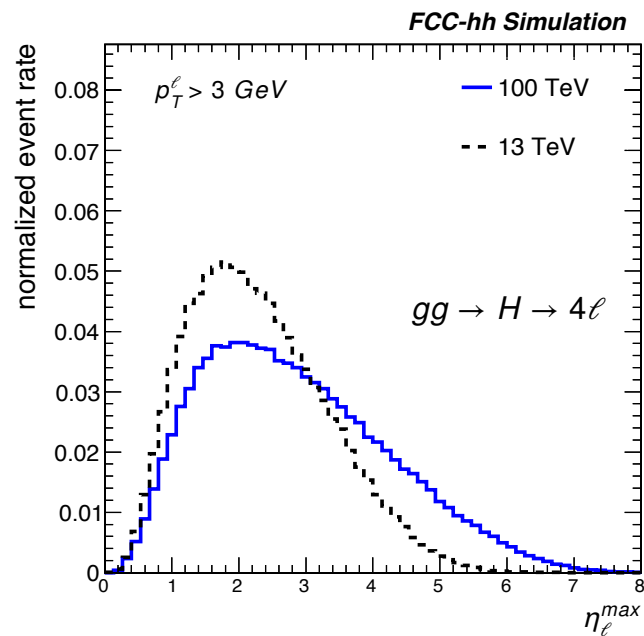
Aim to have a first rough draft by
FCC week!

Repository in www.overleaf.com
→ “FCC-hh Physics Analyses”

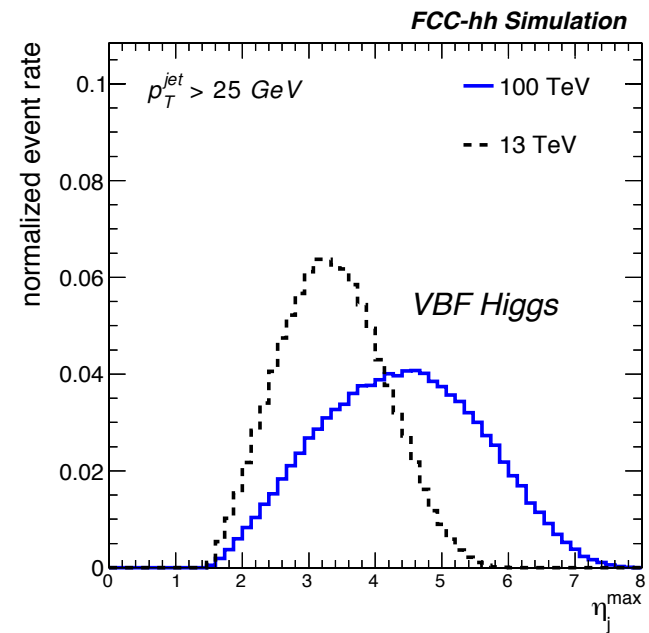
~20 pages of material at this point ☺

Introduction will contain some plots motivating some of the detector requirements, plus some motivation behind the choice of the physics benchmark channels.

E.g. muon acceptance:



Jet acceptance:



Higgs and EWSB

1.2 Higgs and Electroweak Symmetry Breaking

1.2.1 Higgs Properties

Responsible: Michele Selvaggi

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1.2.1.2 $H \rightarrow \gamma\gamma$

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1.2.4 Measurement of Vector Boson Scattering

Responsible: Andre Sznajder, *et al.*

Talk by Michele Selvaggi

Talk by Giacomo Ortona

Also covered in Michele's talk

BSM searches

1.3 Searches for new physics

1.3.1 Resonances: $ee, \mu\mu, jj$

Responsible: Clement Hensens, Michele Selvaggi

1.3.2 Resonances: $WW, t\bar{t}$

Responsible: Clement Hensens, Michele Selvaggi

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Responsible: Loukas Gouskos

1.3.4 Dark Matter: monojet + DM, $t\bar{t}$ + DM, VBF + DM

Responsible: Phil Harris

1.3.5 Dark Matter: disappearing tracks

Responsible: Ryu Sawada, Koji Terashi, Masahiko Saito

Talk by Clement Hensens

Talk by Loukas Gouskos

Talk by Ryu Sawada

Amsterdam talks



For all speakers next week:

Remember that most people in the audience are non-experts.

There is no need to introduce the FCC collider or detector in general. But please do add some introduction about the physics channel that you are studying (what is it? why is it interesting? what is the challenge?) and possibly about detector subsystems that are critical to your analysis.

Today's agenda



14:00 → 14:10 **Introduction**

Speakers: Filip Moortgat (CERN), Heather Gray (LBNL)

14:10 → 14:40 **Higgs & EW Symmetry Breaking**

Speaker: Michele Selvaggi (CERN)

14:40 → 15:10 **Heavy resonance searches at the FCC-hh**

Speaker: Clement Helsens (CERN)

15:10 → 15:30 **Top squark searches at 100 TeV**

Speaker: Loukas Gouskos (Univ. of California Santa Barbara (US))

15:30 → 15:45 **Single Production of Charged Higgs Boson at Future Circular Hadron Collider**

Speakers: ILKAY TURK CAKIR (TURKISH ATOMIC ENERGY AUTHORITY), Ilkay Turk Cakir (Istanbul Aydin University),

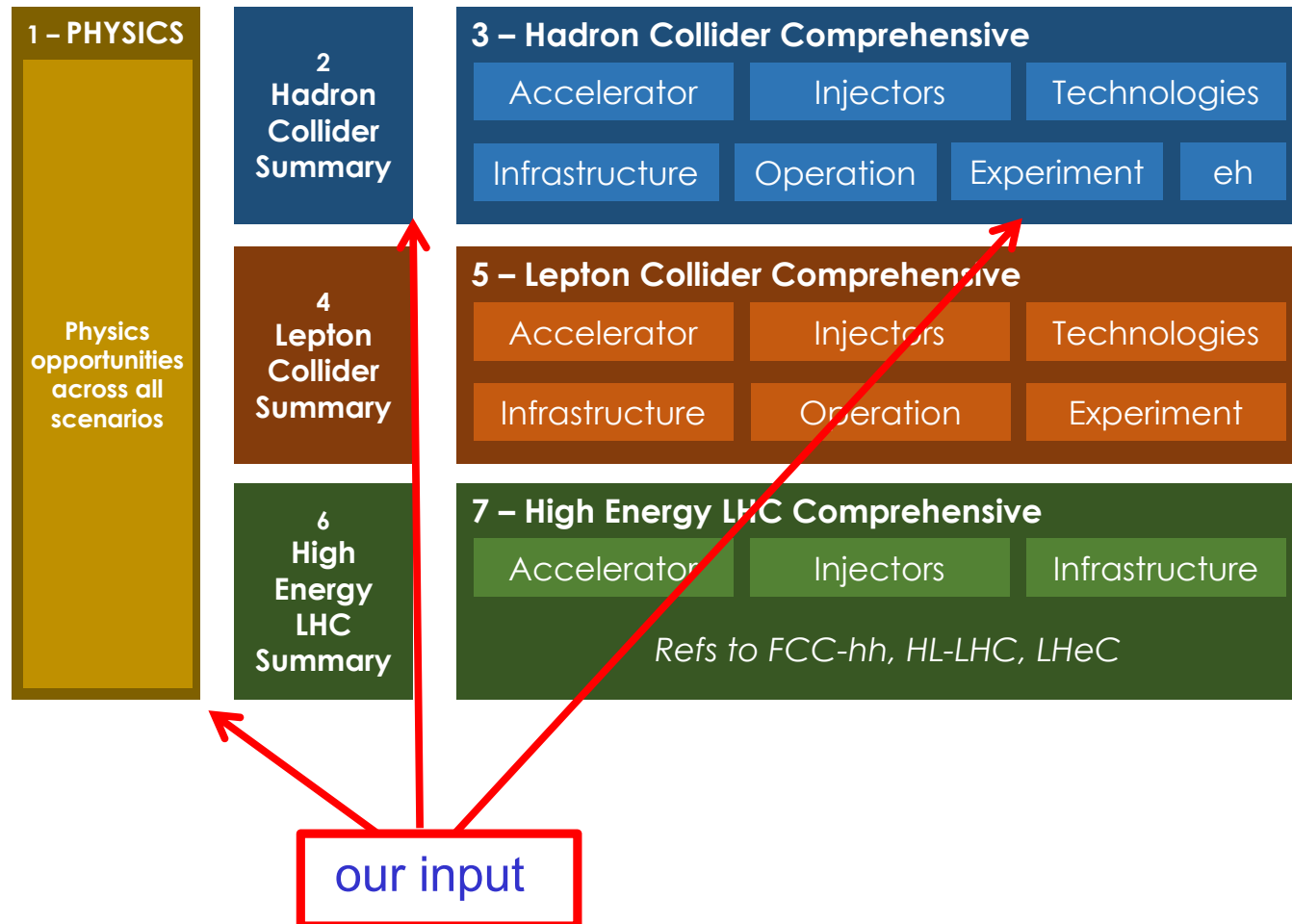
15:45 → 16:10 **Measurement of the Higgs Self-Coupling in the $HH \rightarrow VVbb$ Channel at the FCC-hh Collider**

Speakers: Dr Giacomo Ortona (Centre National de la Recherche Scientifique (FR)), Michele Selvaggi (CERN)

Next appointment is during FCC week in Amsterdam:
our 2 sessions are on Wednesday afternoon



CDR 2018



- Required for end 2018, as input for European Strategy Update
- Common physics summary volume
- Three detailed volumes FCChh, FCCee, HE-LHC
- Three summary volumes FCChh, FCCee, HE-LHC

Reminder



There is a montly **informal meeting** to discuss **FCC-hh physics analysis studies** aimed towards the CDR in 2018. Please don't hesitate to contact us if you have anything you'd like to discuss.

How to get started on 100 TeV Physics studies?

- Pick a topic from the list of 100 TeV Physics Benchmarks:
<https://docs.google.com/document/d/1l7SbsqleXnuyPvhqMjPeiy8qsFdz8LoxQLEQYxbrNIU/edit>
- Follow the FCC Pythia + Delphes + Heppy tutorial:
<http://fccsw.web.cern.ch/fccsw/tutorials/fcc-tutorials/FccFullAnalysis.html>
- Check the MC event database:
<http://fcc-physics-events.web.cern.ch/fcc-physics-events/index.php>
- Keep us (Heather Gray & Filip Moortgat) informed about your plans & progress