

**WG1-PREC “Precision in theory and experiment”**

# **MiniWorkshop**

## **“Cross section lineshapes”**

Friday April 14<sup>th</sup> 2023

Paolo Azzurri (INFN Pisa), Ayres Freitas (Univ. Pittsburgh),  
Adrian Irlles (IFIC CSIC/UV), Andreas B. Meyer (DESY)

**ECFA Higgs Factory Working Group WG1 on Physics Potential**

# ECFA Higgs/EW/Top Factory Workshop

Kick-off meeting in June 2021: <https://indico.cern.ch/event/1033941/contributions/4342858/>

**Aim: ...bring together the efforts of various e+e- projects, to share challenges and expertise, to explore synergies and to respond coherently to this high-priority strategy item.**

- foster collaboration across projects
- between experimentalists and theorists
- facilitate entry for “newcomers”

**Checkpoints:**

- **community-wide plenary ECFA workshops in 2022 and 2023 final “ECFA report”**
- **5 – 7 October 2022 at DESY** <https://indico.desy.de/event/33640/timetable/#all>

**Between the big events: organize smaller events, e.g. miniworkshops and seminars**

# ECFA Higgs Factory Study - WG1 Physics Potential

## Subgroup WG1-PREC “Precision in theory and experiment”

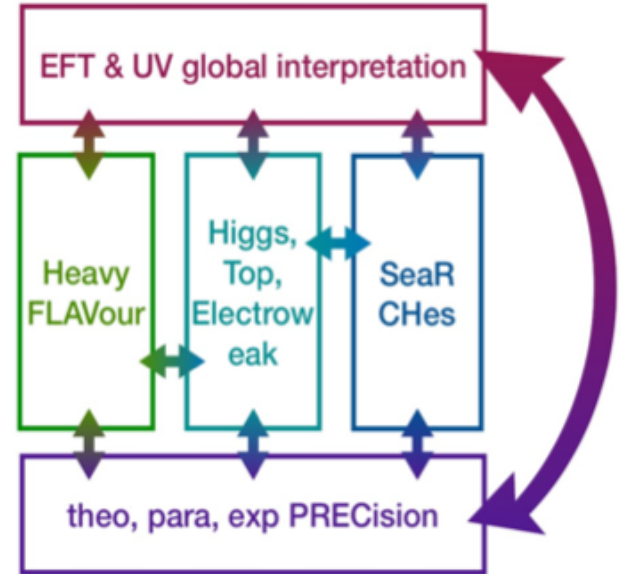
- One of the five subgroups of ECFA-WHF-WG1
- Addressing very high-precision observables

## Topics:

- Precision calculations and theoretical, parametric uncertainties -  $\alpha_S$ ,  $m$  and  $\Gamma$  for  $W$ ,  $Z$ ,  $H$ ,  $t$
- Experimental syst. uncertainties, together with WG2 and WG3

## Interplay:

- Other WG1 subgroups, in particular HTE, FLAV, and GLOB
- Interface with WG2 for object performance, generator and simulation for high-precision measurements



# What we did so far in 2022

Tuesday 8 March **MiniWorkshop: “Measurements at very high precision at future ee colliders”**

<https://indico.cern.ch/event/1129966/>

Thursday 10 March: **MiniWorkshop: “Parametric uncertainties at future ee colliders:  $\alpha_s$ ”**

<https://indico.cern.ch/event/1131344/>

7-17 June: **Organized by CERN: Precision calculations for future e+e- colliders: targets and tools**

<https://indico.cern.ch/event/1140580/>

14 July: **MiniWorkshop: “Parametric uncertainties at future ee colliders:  $\alpha_{em}$ ”**

<https://indico.cern.ch/event/1173700/>

2 November: **MiniWorkshop: “Collision Energy”**

<https://indico.cern.ch/event/1206598/>

14 December: **MiniWorkshop: “Luminosity”**

<https://indico.cern.ch/event/1218043/>



# Focus topic teams

- Luminosity (WG1-PREC conveners + Jenny List)
  - Mogens Dams (FCCee)
  - Ivanka Bozovic (ILC/CLIC/CEPC)
  - Andre Sailer (CLIC)
  - Fulvio Piccinini (MC, BabaYaga)
  - Wieslaw Placzek + Maciej Skrzypek (MC, BHLUMI)
  
- W mass (WG1-PREC conveners + Jorge De Blas Mateo)
  - under construction

AIM : Foster joint work between circular and linear colliders on selected topics,  
First step : form a small team of experts who have worked on this (or closely related) aspects in the past, in order to summarize the state of the art and define in more detail what \*should\* be done in order to move beyond - in terms of experimental studies, MC, theory etc Such a program would then, in a second step, serve as a basis to involve especially younger people to actually take on some of the work items.

# Today

## WG1-PREC MiniWorkshop: “Cross Section Lineshapes”

<https://indico.cern.ch/event/1271343/>

- **The Z pole lineshape** Christoph Paus (Massachusetts Inst. of Technology)
- **The W-pair production lineshape** Paolo Azzurri (Universita & INFN Pisa )
- **The top-pair production lineshape** Frank Simon (Max-Planck-Institut fuer Physik)

More info to come soon via the cern e-group (stay tuned!)

### Email list

For future WG1-PREC events, please subscribe here, and/or forward the link to interested colleagues:

<http://simba3.web.cern.ch/simba3/SelfSubscription.aspx?groupName=ecfa-whf-wg1-prec>

(this link and email list also works for non-cern accounts)

# Links

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## WG1 portal page on indico

<https://indico.cern.ch/event/1044297/page/23971-wg1-group-activities>

## WG1 seminars and events

<https://indico.cern.ch/category/14055/>

## WG1 twiki page (being formed)

<https://twiki.cern.ch/twiki/bin/view/ECFA/ECFAHiggsFactoryWG1>