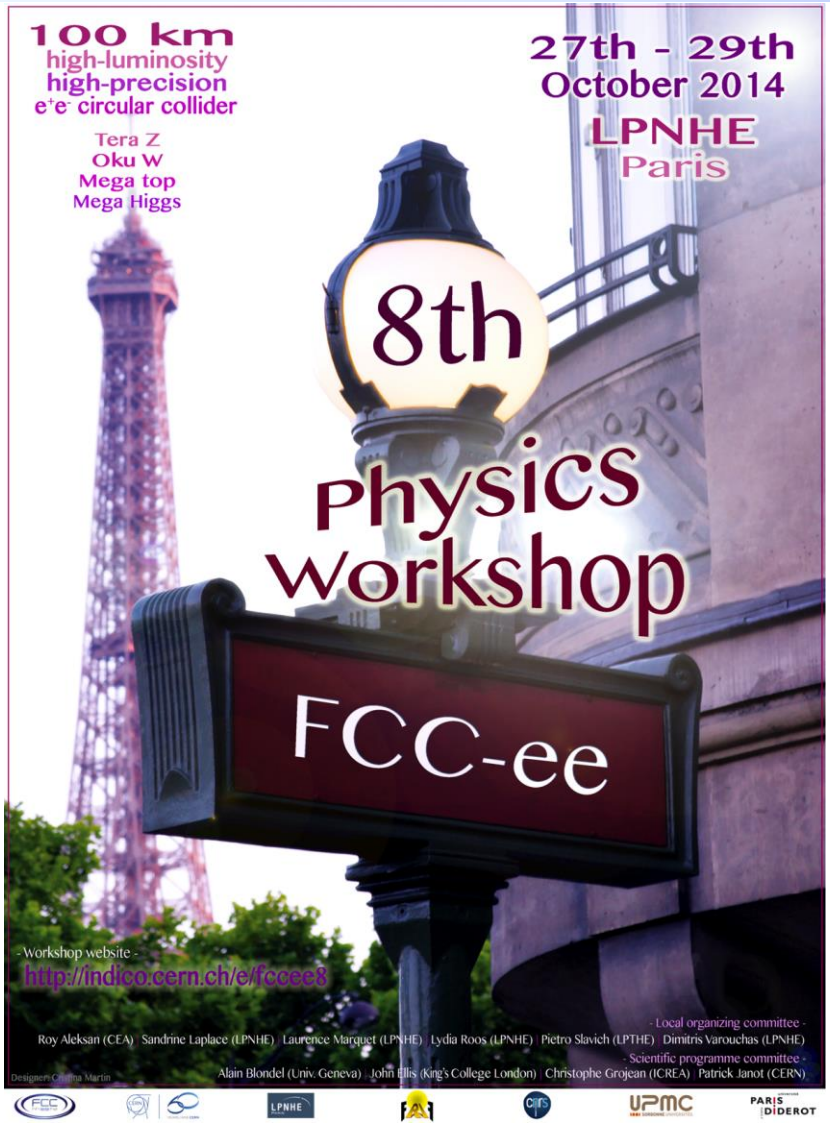
Goals of the 8th FCC-ee/TLEP workshop



FCC
hh ee he

Wrap-up of 7th FCC-ee/TLEP Workshop (1)

Wrap-up of 7th FCC-ee/TLEP Workshop (2)

Successes of FCC-ee Physics workshop

-1- All top level conveners are nominated and engaged!

congratulations to Patrick and to the conveners!

-2- Software effort is underway

big thanks to Benedikt Hegner et al!

-3- Nice participation by e+e- Linear collider colleagues

part of FCC-ee mandate. We all agree that the next machine should be an e+e- collider.

(Thanks to Simon, Wilson, Sailer, Mele, Heinemeyer, Grojean, Brient, Haddad, etc...)

We re-invented the wheel (circle) but we do not need to re-invent the electron!

-4- Complementarity with hadron machine is not just words

ttH coupling is a good example

-5- Reaching out to dark matter, BAU and neutrinos

invisible widths, direct search for rare Z,H, W ... decays

-6- We are discovering the immense potential offered by the high luminosity e+e- Z,W,H,t factory

Wrap-up of 7th FCC-ee/TLEP Workshop (3)

- **More top-level conveners joined the team since June**
  - **Fulvio Piccinini joined Roberto Tenchini in August (EW Physics @ Z)**
    - **He will give his views about Z physics and theory requirements on Tuesday morning**
  - **Benedikt Hegner and Colin Bernet took over Fabiola and myself in September (Physics Software)**
    - **Big steps were made in the software framework developments**
      - **➔ See the software tutorial on Tuesday afternoon**
  - **Christos Leonidopoulos is on the verge to convince a co-convener to join him for Online and Trigger studies**
    - **His own goal for this workshop !**
  - **Co-conveners still missing for WW physics (Roberto Tenchini), top physics (Patrizia Azzi), experimental environment (Nicola Bacchetta), and the phenomenology groups (Sven Heinemeyer, Andreas Weiler, John Ellis).**

Experimental Studies: Conveners

- **Coordinators A. Blondel, P. Janot**
  - **Study the properties of the Higgs and other particles with unprecedented precision**

EW Physics (Z pole)	Diboson physics, m_W	H(126) Properties	Top Quark Physics
R. Tenchini F. Piccinini	? R. Tenchini	M. Klute K. Peters	? P. Azzi

QCD and $\gamma\gamma$ Physics	Flavour Physics	New Physics
D. d'Enterria P. Skands	S. Monteil J. Kamenik	M. Pierini C. Rogan

  - **Develop the necessary tools** ⇑ **Understand the experimental conditions**

Physics Software	Online & Trigger	Exp'tal Environment
C. Bernet B. Hegner	!?! C. Leonidopoulos	? N. Bacchetta
Synergy with FCC-hh,, LHC, Linear Colliders	⇓	Synergy with FCC-hh and Linear Colliders

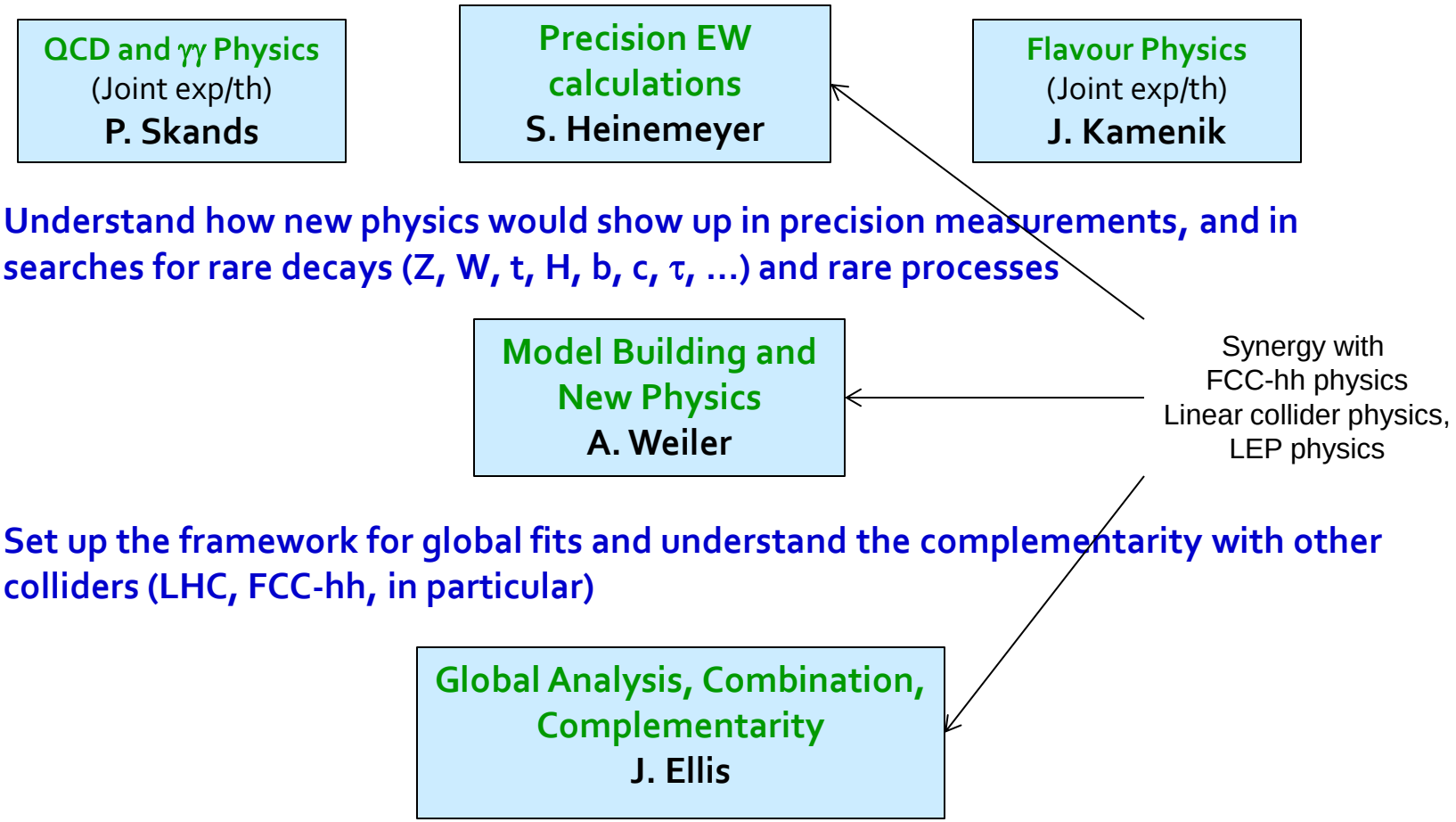
  - **Set constraints on the possible detector designs to match statistical precision**

Detector Designs
A. Cattai G. Rolandi

Synergy with Linear Collider detectors and others

Phenomenological Studies: Conveners

- **Coordinators: J. Ellis, C. Grojean**
  - Set up a long-term programme to match theory predictions to experimental precisions



  - Understand how new physics would show up in precision measurements, and in searches for rare decays (Z, W, t, H, b, c, τ, …) and rare processes
  - Set up the framework for global fits and understand the complementarity with other colliders (LHC, FCC-hh, in particular)

Wrap-up of 7th FCC-ee/TLEP Workshop (4)

NOW we have a lot to do!

-- prepare nice talks for ICHEP and other places
-- speakers and posters:
please send around talks and posters for comments no later than
Thursday 26 June (one week before)

-- need 2 physics speakers for HF2014 (8-11 Ot. '14 in Beijing)
and a few other conferences. Dont be shy, volunteer.

F. Zimmermann
Wednesday afternoon

-- Get working groups working, first identify issues and needed tools

-- Prepare first report for Q1 2015.

-- IP region design issues need to be identified and understood
(we saw a lot this morning)
-- work for now is to list issues comprehensively
-- dont jump on solutions!

-- This is a FANTASTIC machine, but lots of new things to do.
➔ Form technical and institutional collaboration !

21.06.2014 **TLEP7 concluding remarks Alain Blondel** 8

Get working groups working… (1)

- **First identify issues and needed tools : Get together !**
  - **FCC-ee Physics coordination**
    - **Dates for the next two meetings**
      - **➔ 12 November, 12:00 pm and 11 December, 10:30 am**
  - **FCC-ee physics/accelerator vidyo meetings**
    - **Monthly, except months with a FCC-ee physics workshop**
      - **➔ Next accelerator meeting, Monday 3 November, 4pm**
      - **➔ Next physics meeting at the end of November**

        Need your input for talks / studies / proposals …
  - **FCC software meetings**
    - **Weekly, every Thursday at ~noon**
      - **➔ Regular attendance (15 people), lots of work being done**
  - **Group meetings: a few have happened (QCD, Flavours).**
    - **It's time to start planning more, to motivate people to work with you**
      - **➔ Can use monthly physics meetings to start with**
  - **All these meetings appear on https://cern.ch/fcc-ee/**

Get working groups working… (2)

- **Prepare/choose projects and work-packages in a consistent work plan**
  - Proposed projects can be found at http://cern.ch/fcc-ee
    - Then go to Organization, Experimental Studies (for example), WGxx
      - ➔ See Top physics, Physics software, Detector designs or New physics

      You are encouraged to e-mail your conveners if you don't find any

- **Projects for Experimental Studies WG's**
  - Some will be discussed here — Wednesday morning/afternoon
    - Online, Top, Higgs, Flavours, New Physics (SUSY, Sterile neutrinos), Diboson physics and m_W
  - Together with the result of some early studies

- **Plans for Phenomenological Studies WG's**
  - Some will be discussed here — Tuesday morning
    - BSM physics, Precision EW calculations

Get working groups working… (3)

- **Urgent deliverables (possibly by March 2015, 1st FCC annual meeting)**
  - **Software developments** Tuesday afternoon
    - Have a working/documented framework and trained users
      - ➔ Generators, event data model, parameterized simulation, analysis framework, analysis tools
    - Enable specific detector studies with full/fast simulation
      - ➔ Geometry, GEANT4, …
  - **Detector studies** Next workshop in Pisa, 3-5 Feb 2015
    - Review characteristics of existing detectors / projects
    - Implementation in a parameterized simulation (e.g., DELPHES)
    - Get ready for the evaluation of the physics performance
      - ➔ physics objects, benchmark analyses
  - **Experimental environment** This afternoon
    - Beamstrahlung simulation (lumi spectrum, backgrounds)
    - Luminosity measurement (crossing angle)
    - Integration in the crab-waist scheme (L*, magnetic field shielding, SR)

Get working groups working… (4)

- **Do we have people working in the working groups ?**
  - **A few in the Physics Software group**
    - **One project associate, one technical student, one doctoral student**
      - **➔ All already at work**

      Few talks on Tuesday afternoon
    - **One CERN applied fellow requested**
  - **A collaboration is being built**

    1st IB took place in September
    - **MoU's are being signed**
    - **MoU Addenda with specific work are proposed by institutes**
      - **➔ See the (regularly updated) list of institutions and agreements**

https://espace2013.cern.ch/fcc/collaboration/Lists/Agreements/Agreements%20status.aspx

  - **We need more universities and labs to join and work with us**
    - **E.g., IN2P3 (France) and INFN (Italy) have signed the MoU**
      - **➔ We now welcome addenda from (French, Italians, …) labs/universities**

And get used to work together towards the FCC realization

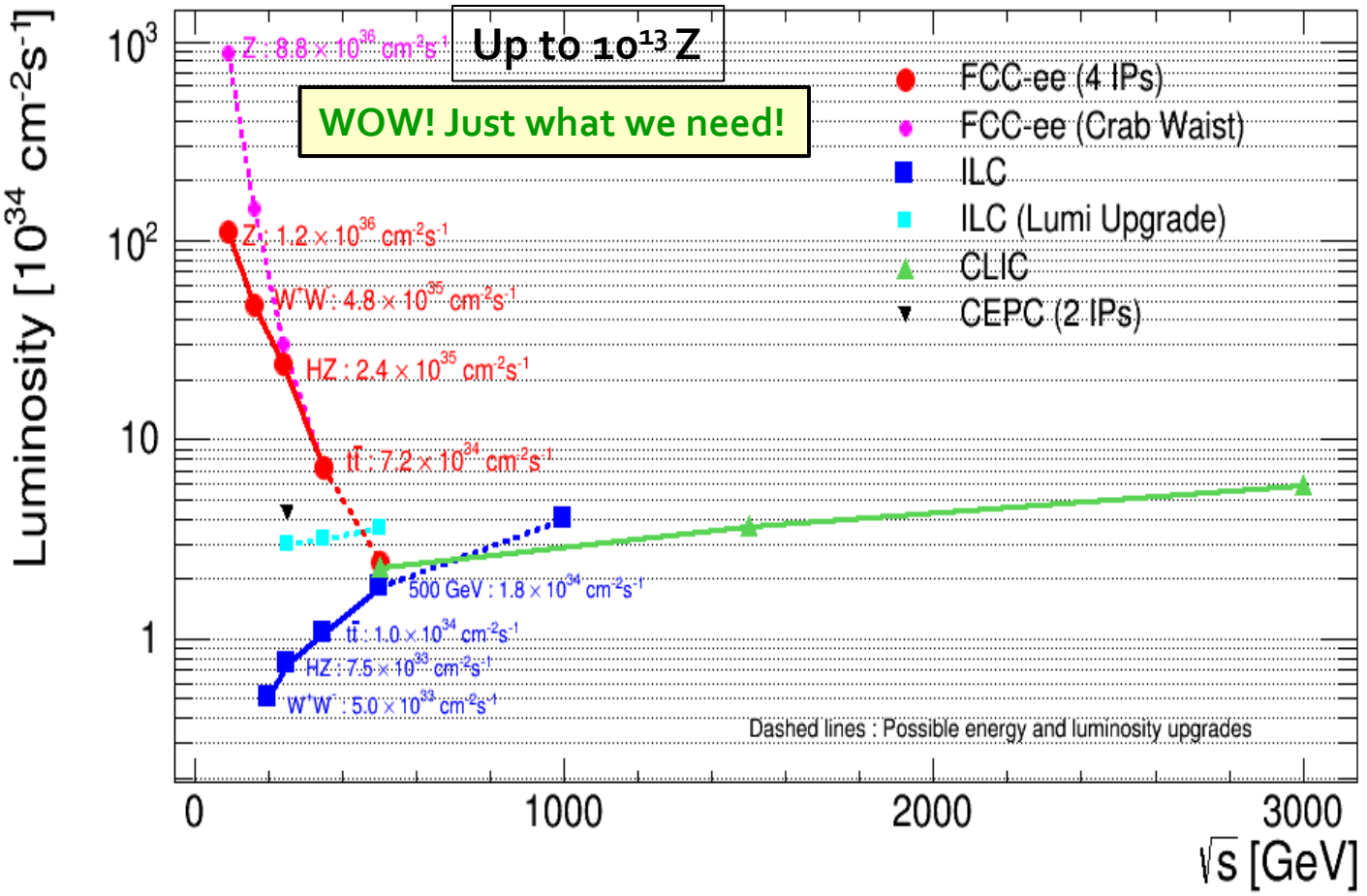
Communicating what we do …

- **A interim report is in preparation**
  - https://www.authorea.com/users/1331/articles/10470/
    - Deadline for 1st draft: 11 December 2014. Final draft discussed in Pisa.
      - ➔ To be ready for the first annual FCC meeting in Washington
        23-27 March 2015, http://indico.cern.ch/event/340703/
    - Goal 1: remind the reasons and the objectives of the FCC-ee study
    - Goal 2: document the overall setup for the study
      - ➔ Software, detectors, experimental environment, online
    - Goal 3: summarize work plans and work packages, with needed FTE's
- **Making the FCC-ee better understood and more visible**
  - Cristina will interview some of you during th…
  - Volunteer for talks in conferen… …ps
  - Give seminars in y…
  - Speak t… …medias of the FCC, and of the FCC-ee
  - …e actively to Linear Collider workshops
    - There are many synergies to work on for us and our e^+e^- colleagues

Make your slides appear on the FCC-ee web site

Interaction region (1)

- **Target luminosity is huge!**
  - **Interaction region design issues need to be identified and understood**

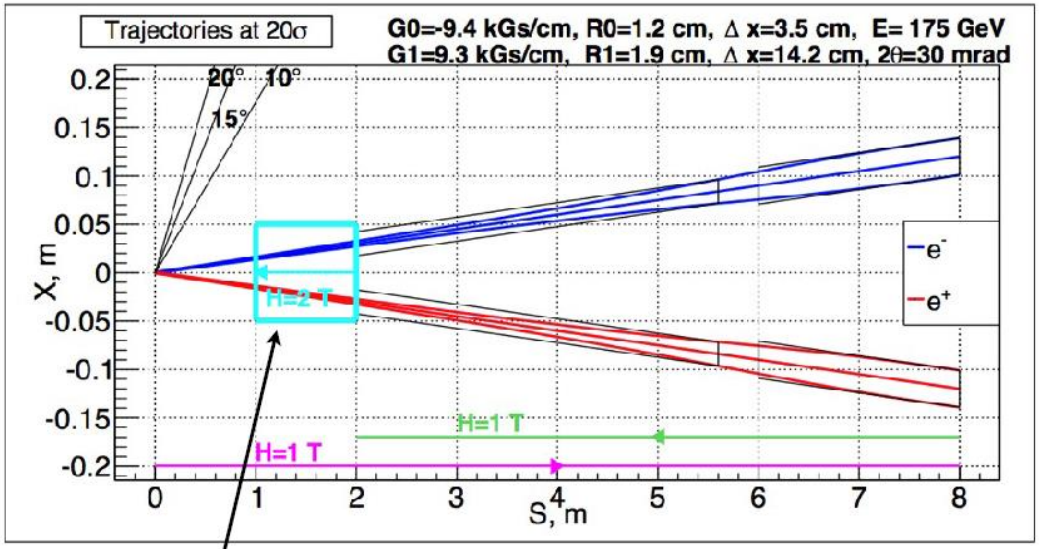


Interaction region (2)

- **Large luminosity comes at a cost**
  - **But it still needs to be measured**

TLEP - Interaction Region

- As presented by Anton Bogomyagkov



- L* = 2m
  - But what is this - Is there any room at all for luminosity monitors...?

Luminosity Monitoring | FCC-ee Workshop, June 21th 2014 | Mogens Dam / Niels Bohr Institute | 7

- **Need to understand and talk to each other**

Interaction region (3)

- **Interaction region is the main topic of this afternoon**

15:00 - 18:05 accelerator study and machine-detector interface

15:00 **FCC-ee machine study** *30'*
Speaker: Dr. Jorg Wenninger (CERN)
Material: **Slides**

15:35 **Experimental environment at CEPC** *20'*
Speaker: Manqi Ruan (CERN)

16:00 **Interaction region challenges (via vidyo)** *15'*
Speaker: Dr. Helmut Burkhardt (CERN)

16:20 **Coffee break** *30'*

16:50 **Precise luminosity measurement** *15'*
Speakers: Dr. Ivanka Bozovic-Jelisavcic (University of Belgrade (RS)), Strahinja Lukic (University of Belgrade (RS))

17:10 **Beam energy calibration: systematic uncertainties** *15'*
Speaker: m Koratzinos (Universite de Geneve (CH))

17:30 **Monochromatization schemes for s-channel Higgs production** *20'*
Speaker: Angeles Faus-Golfe (Instituto de Fisica Corpuscular (ES))

17:50 **Discussion** *10'*
Speaker: All