TLEP News

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Editors:
the TLEP Steering group
Online version:
http://tlep.web.cern.ch

Editorial: Let's get to work!

This letter is the first of the TLEP newspaper. It is not a scientific publication and is intended to be used to inform the community which subscribes to the TLEP study, on the developments in the TLEP project. It is deliberately sparkled with working class (working in physics, that is) humour and opinion. We will make every effort to come out monthly. Proposed contributions are welcome from all!

Our prime motivation is physics. The discovery of the H(126) particle, an everyday better candidate for the minimal Standard Model scalar 'Higgs Boson', has made the problem of the next machine better defined and more focused. The LHC has been performing extremely well, and definitely promises to be a very good Higgs Factory in the future; these performances and the high quality of the results set very high standards for the next machine – much higher than had been envisioned so far. This is the challenge we want to meet with TLEP. We believe that facing the physics challenges is the best scientific strategy.

The CERN Council approved the European Strategy Update in May 2013 and recommends that the LHC and its high luminosity upgrade be the first priority. Next comes vigorous R&D towards an "ambitious post-LHC accelerator project". Depending on the results of the next LHC run at 14 TeV, this project could be either CLIC, or TLEP as a precursor of the very high energy pp collider, VHE-LHC. While CLIC would allow high energy e+e- collisions (>1TeV), TLEP offers the unique possibility of very high luminosity from the Z peak all the way to the $\bar{t}t$ threshold. Clearly these possibilities interfere with the ILC, but this should not be an obstacle from holding a healthy physics discussion within the community – see the talks posted on the tlep website under 'useful documents'. As far as we can tell, the cost of TLEP (including the re-useable tunnel) is expected to be lower than that of the ILC and its starting date could be within error bars the same as the ILC, at least from the technical point of view.

The scientific question thus boils down to the following: how important is it to explore energies higher than 350 GeV with an e^+e^- machine? As of today, the LHC has seen the one Higgs boson and excluded many new physics scenarios up to scales of several hundreds GeV. This does not provide a strong physics case for e+e- collisions at 500 GeV or even 1 TeV, but favours high precision measurements of Electroweak parameters and of the Higgs boson properties at energies below 350 GeV. This simple picture may change if a departure from the minimal SM is observed in the LHC data to be collected at 14 TeV from 2015 to 2017 ***and***

if this departure requires a high-energy e^+e^- machine to be studied. This perspective sets our schedule. By that time, we must be ready with the best possible (where "possible" includes "feasible and affordable") Higgs factory proposal. Let's get to work.

Design study: 200!

On 21 May 2013, at 19:51, we recorded the 200th subscriber to the TLEP design study. Congratulations to Jean-Baptiste who has won 1'000'000 tagged Englert-Higgs bosons – at the condition that he manages to raise 1 billion CHF to build TLEP. Our warmest thanks go to the other subscribers. Three times more and we can start digging the 80 km tunnel. Isn't it easy?

The number 200 may seem small, but we should recall that these are people who actually signed up to ***work*** within specific working groups -- another 15 of you have signed up just to be informed. Let's now see some interesting statistics. More details can be found on the TLEP web site.

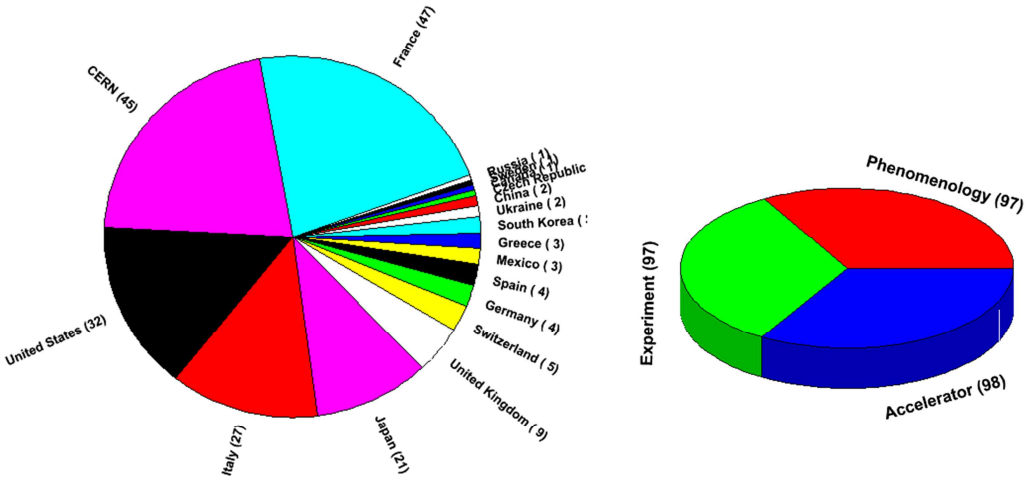

Figure 1 Left : distribution of the first 200 subscribers on the basis of the institute's country. Right: distribution between accelerator, experiment and phenomenology.

The distribution of the country of origin reflects the youth of the TLEP project and the very different levels of awareness in the different countries. We will now prepare the design study proposal to ECFA, to be discussed at the r-ECFA session of 20 July in Stockholm. If all goes well the TLEP study will be noted and advertised by ECFA and the various committees with pan-European audience. The interest raised in the USA and Japan is remarkable. The audience is interestingly well balanced between Accelerator, Experiment, and Phenomenology -- the agreement with the democratic three colour model is too good to be a statistical fluctuation!

Next TLEP Design Study events

The **5th TLEP workshop** will take place at Fermilab 25-26 July 2013 (just before the "Snowmass" workshop). This workshop received enthusiastic local response and is supported by the DOE. With respect to the previous workshops, the program will feature more emphasis on the phenomenology. Registration to the workshop can now proceed at the following web site: http://indico.cern.ch/conferenceDisplay.py?confId=246137. Remote connection will be available – please register even if you plan to follow remotely.

The **6th TLEP workshop** will be held at CERN 16-18 October 2013. By then, the design study organization should be in place. Follow this space!

The official VHE-LHC/TLEP design study kick off meeting at CERN will be in February 2014.

IPAC'13 in Shanghai

Who said TLEP is not global? The International Particle Accelerator Conference in Shanghai featured several posters on circular e+e- Higgs factories including a couple of nice posters by our Chinese colleagues (D. Wang et al., IHEP-AC-LC-Note2013-005, arXiv:1304.2502v1[physics.acc-ph] and IPAC13 contribution TUPME021) as well as a TLEP group poster http://arxiv.org/abs/1305.6498 prepared by Mike Koratzinos. The latter features a consistent evaluation of luminosity from the Z peak to the top pair threshold, showing that the beamstrahlung effect can be consistently taken into account with reasonable numbers for the emittance ratio $\varepsilon_x/\varepsilon_y$, the refill time, and a momentum acceptance of 2.5% -- the advertised luminosity of 5 $10^{34}/cm^2/s$ in each of 4 IPs is confirmed at 240 GeV center-of mass. The same paper presents a carefully calculated version of the power consumption by the experts.

Photos of an impromptu optics working group session led by Bernhard Holzer on the Shanghai Bund as captured by the paparazzi:

Figure 2 TLEP optics Working group meeting on the Bund in Shanghai. Left: Katsunobu Oide, Bernhard Holzer, Mike Koratzinos (Photo Ralph Assmann) ; right: Alain Blondel, Manuela Boscolo, Ralph Assmann (photo Frank Zimmermann).

Towards Yellow Reports

The TLEP Design Study is being structured by Frank Zimmermann (Accelerator Studies), Patrick Janot (Experimental Studies) and John Ellis (Phenomenological Studies). Working groups will be set up, and conveners are in the process of being appointed to meet well-

defined objectives.

One of the concrete outcomes of the Design Study will be a series of Yellow Reports. For an efficiently shared development of these reports, we decided to adopt - at least for a six months test period - an online collaborative tool able to understand LaTeX (and most web formats) with a robust versioning control system in the back-end (GIT). This tool is named Authorea: http://www.authorea.com.

You now all have an account with Authorea (which you have to activate within a month) to try it by yourself: you'll discover a quite intuitive tool, with a easy-to-follow online tutorial. It will allow us to write our yellow reports as we work, in a completely transparent and shared manner. The situation will be reviewed in six months from now. If Authorea satisfies all our needs, CERN might officially support and adopt it for future Yellow Reports. Here too, TLEP is at the forefront of the development in High Energy Physics !

If you are curious and go to your homepage, you will already discover the rough skeletons of the 11 chapters of the TLEP experimental studies, soon to be followed by the 12 chapters of the accelerator studies, and later by the chapters of the phenomenological studies Your comments are already very much welcome to point out missing aspects, fix obvious mistakes, suggest some re-organization, or express your interest to lead and/or participate to a working group. Just send a mail to TLEP3-steering-group@cern.ch.

Mailing Lists

Let's communicate! To this end, several mailing lists have been created, with obvious names:

- TLEP-AcceleratorStudies@cern.ch,
- TLEP-ExperimentalStudies@cern.ch,
- TLEP-PhenomenologicalStudies@cern.ch,
- TLEP-Observers@cern.ch.

The last list consists of those of you who subscribed to the TLEP Design Study, but did not indicate a domain of expertise. The four mailing lists above are merged in a single list called TLEP-DesignStudy@cern.ch.

TLEP Logo contest

Yes, you can make your mark! We have been doing our best amateur job for the TLEP logo (above) – the present version is a perpetual evolution of the original idea by Mike Koratzinos. The TLEP Logo is open to a public contest. Please send suggestions to Mike michael.koratzinos@cern.ch within the next month – a selected committee will chose among the proposals.

Conferences

We are receiving more and more invitations to speak at conferences. If you feel motivated, convinced and willing to represent TLEP, please volunteer to the TLEP (ad interim) steering group TLEP3-steering-group@cern.ch