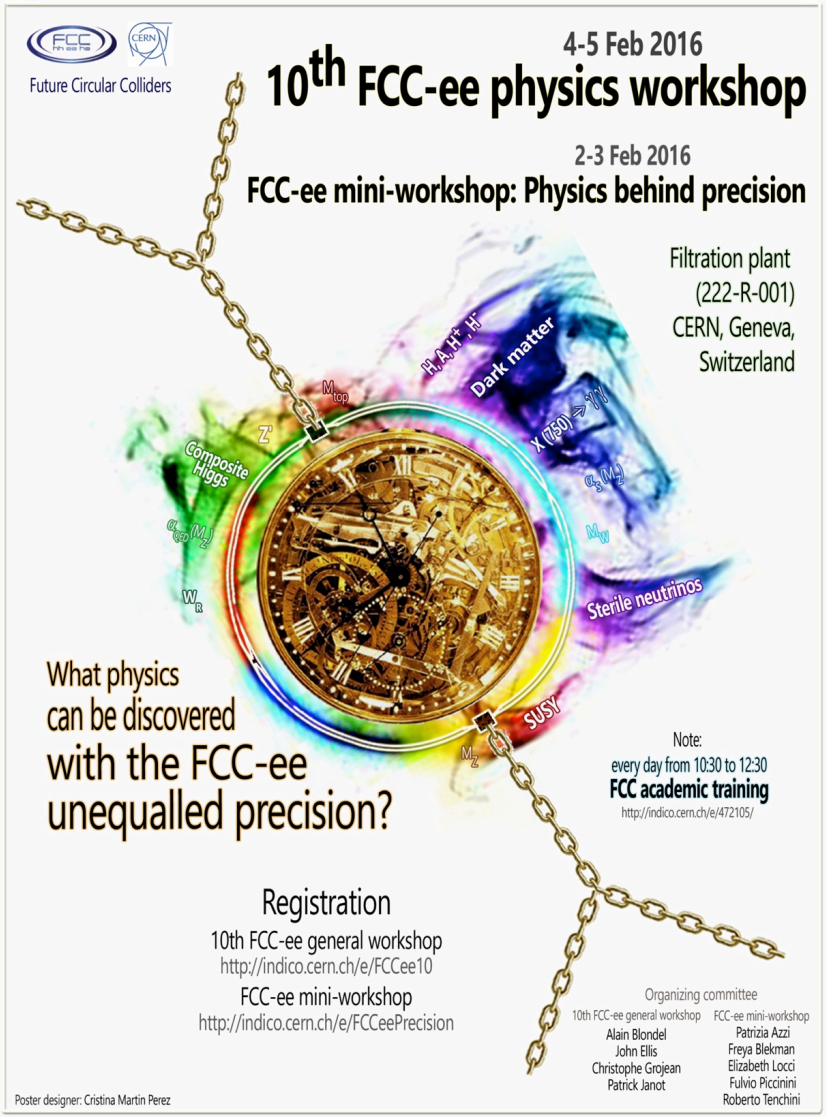
Poster Contest: Results

- **Description of the poster**
  - Fact 1: A pocket watch with its chain
  - Fact 2: Watch mechanism somehow visible
  - Fact 3: The watch rim is the FCC-ee collider
    - The RF holds the chains
  - Fact 4: SM inputs and new physics around

- **Basic intepretation**
  - (Swiss) clock stands for FCC-ee Precision
  - Swiss (clock) means FCC-ee in Geneva
  - The mechanism represents the CERN existing injector complex
  - Altogether
    - FCC-ee
    - Unequalled precision
    - At CERN



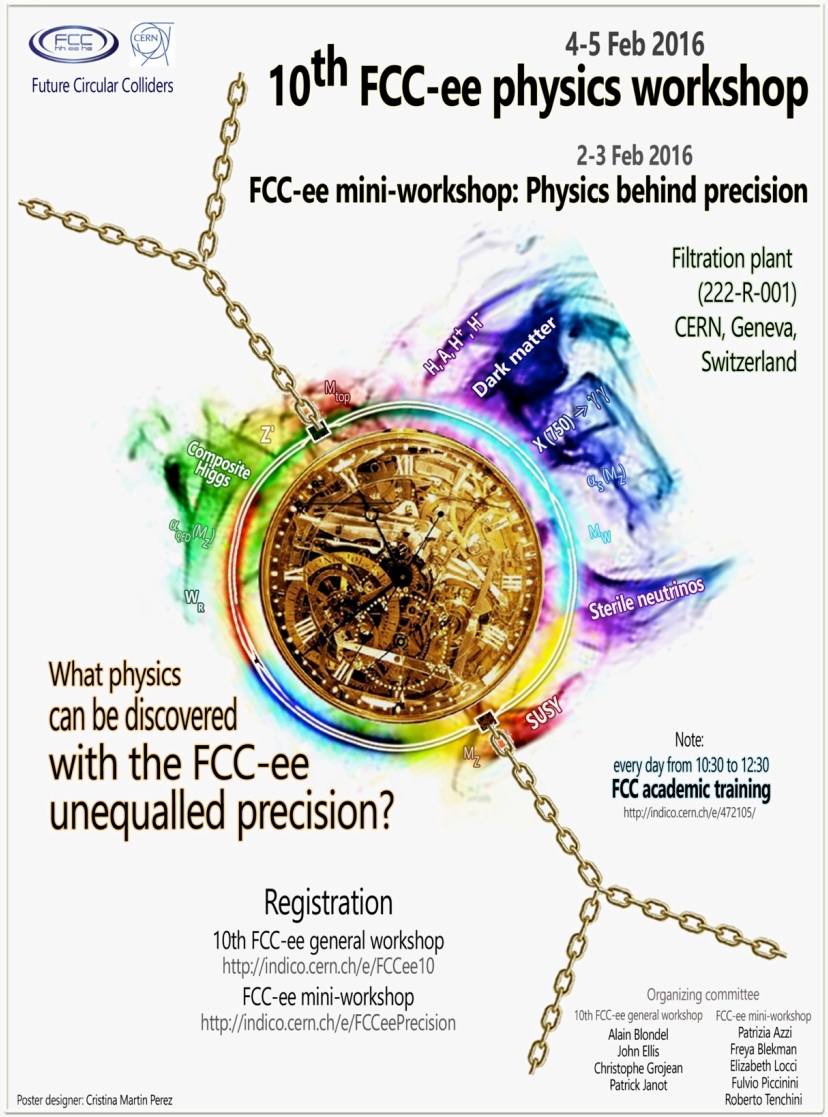
Poster Contest: Results

- **Higher-level interpretation**
  - The chains represent a Feynman diagram
    - e.g., $e^+e^- \rightarrow \mu^+\mu^-$ at FCC-ee
  - The watch stands for the 1st loop correction
    - with SM and BSM (?) particles
    - The RF is the coupling power to (SM or new) particles
  - The inner circles represent higher-orders
    - Needed to match the exp'tal precision
    - And to determine SM inputs
  - The mechanism describes the quantum structure of the underlying theory
    - Unveiled with FCC-ee precision
    - And characterizing the new physics
      - ➨ Whatever it is !

      Including X(750) → γγ
  - Colours indicate the possible energy scales for new physics, unveiled by the FCC-ee precision, all the way to 100 TeV.

Poster contest: results

- **Ten participants**
  - Sandrine Laplace
  - André David
  - Christos Leonidoupoulos
  - Guy Coignet
  - Stéphane Monteil
  - Michele de Gruttola
  - Werner Riegler
  - Philippe Schwemling
  - Eros Cazzato
  - Mogens Dam



Poster contests

Personal interpretations

Another interpretation that has been put forward refers to the to 'chain legs' in the picture as representing Patrick and Alain having a tight grip on the FCC-ee project. This idea is heavily disputed in the FCC management. Werner

The watch is here to show that we are in a real hurry to discover new physics Sandrine

The clock is ticking ! André

“Recherches des pièces détachées manquantes de la montre à remonter le temps” Guy

The ticks of the swiss device introduce the possibility of subtle polarization measurements and I was even able to read that Weinberg angle is close to pi/6. Stéphane

The authors felt undoubtedly ill at ease with the fact that the swiss device is strongly inducing a deterministic view of the Nature. They've in turn chosen a probabilistic and colorful background to overcome this undesirable note. Stéphane

You need a loop to investigate loops.
A linear collider would only do Born level. Mogens

Ranking(s): Everybody won

- Fastest answer by Sandrine: 11'40" after the call
- Shortest answer by André: 4 words
- Longest answer by Philippe: two-three pages
- Most obscure answer by Michele: I am still wondering what it means
- Most poetic answer by Stéphane
- Most funny answer by Werner
- Most provocative answer by Mogens
- Most offbeat answers (probably for another poster?) by Eros and Guy
- Most complete answer by Christos
  - Ex-aequo with Philippe, but with 30 times less words, and 22 days before
    - None of the answers got all elements
      - E.g., CERN injector complex, quantum structure, RF

Prizes still under discussion with the FCC management.

Make your own judgement

sandrine Laplace — 8 Jan 2016 12:42
To: Janot Patrick — Hide Details
Re: FCC-ee events and poster contest ! — 3

ben c'est un diagramme de Feynam schematique e+e- -> virtual loop -> quelque chose quelque chose, avec une montre parce qu'on est super presse de decouvrire la nouvelle physique. La montre est aussi entouree par le FCC puisque c'est la qu'on va tout decouvrir.

Sauf le X(750) -> gamgam ou bien ? ;-)

Andre Tinoco Mendes — 8 Jan 2016 12:52
To: Janot Patrick — Hide Details
Re: FCC-ee events and poster contest ! — 5

> On 08 Jan 2016, at 12:29 , Patrick Janot <Patrick.Janot@cern.ch> wrote:
>
> [...] what they see in the poster illustration.

Yes, it was not at all clear to me. Not even now other than that "the clock is ticking".

Christos Leonidopoulos — 8 Jan 2016 13:19
To: Janot Patrick — Hide Details
Re: FCC-ee events and poster contest ! — 6

The hope is that the FCC(ee) collider will allow us to unlock Nature's secrets. The great expectation is that future precision physics measurement will reveal the beauty and complexity of new fundamental physics laws, similar to those found in the hidden clockwork escapement of a precise Swiss watch, enclosed by the FCC rings.

One can think of the clock chains as Feynman diagram lines that lead to the underlying physics to be explored.

Finally, one may be tempted to describe the depicted colours as temperatures of the Universe at different times and fundamental scales, corresponding to the new physics symmetries.

BTW, I think the X(750) --> γγ bit was a little premature. Was that Cristina's idea? :)

Make your own judgement

Stephane Monteil 14 Jan 2016 18:44
To: Janot Patrick Hide Details
Re: FCC-ee events and poster contest ! 21

I'm starting the exegesis of this Masterpiece by the global analysis of the picture. The first identified item is the self-energy of a supposedly fundamental gauge field. This comes as the response of the question on the left. The unprecedented precision finds an illustration in the swiss precision device forming the core of the loop. Hence, the key of the understanding is suggested to be in the precision at which you can qualify the loop. I notice then some electrical activity at the vertex, specifying relevantly in turn that this is where the precision is needed. Some non-trivial elements are picturing the loop and the vertices: detectors at the vertices and the two electron rings accelerator as the way to get there. The ticks of the swiss device introduce the possibility of subtle polarization measurements and I was even able to read that Weinberg angle is close to pi/6.

The authors felt undoubtedly unease with the fact that the swiss device is strongly inducing a deterministic view of the Nature. They've in turn chosen a probabilistic and colorful background to overcome this undesirable note. Remnants or imprints of a higher scale universe appear here and there in the background cloud chamber. The colour palette does not seem to indicate any preferred scale nor energy hierarchy but suggests that the measurements will.

michele de gruttola 19 Jan 2016 12:17
To: Janot Patrick Hide Details
Re: FCC-ee events and poster contest ! 22

Hi Patrick,

let's try,

today I looked at the poster and I think the solution of the rebus is:

"**time to cha**nge **ph**ase with e+e-"

time because of the watch
there are **two chai**nge
phase with e+e- because the Y can be interpreted as **e+e-** pair from a **ph**otons

Make your own judgement

Werner Riegler
To: Janot Patrick
FCC-ee workshop poster competition

25 Jan 2016 14:13
Hide Details

The first impression is of course that of a Feynman Diagram for an e+e- collision, where all the secrets to be unlocked are contained in the loop of the diagram. The outer circle is a representation of the FCC-ee footprint with the two collision points from which the final states are flying outward, as measured by the two FCC-ee experiments, and the many physics objects accessible are listed around the ring. The colours that form the background might represent QCD which is of course also accessible through e+e- collisions, but could be there just for aesthetic purposes.

The clock is certainly the dominant and mysterious center piece of the graphics, which holds many different meanings. In the most superficial interpretation, the clock represents Geneva, center of watch industry, around which the enormous FCC ring is being built, but more importantly the clock represents precision measurement, which is the key asset of the FCC-ee machine.

As a second meaning, a clock often represents the universe as such, and all the details of the clock that are visible symbolize the many details and secrets that the universe holds at that want to be unlocked by the FCC-ee machine.

However the fundamental meaning of this clock is that of representing the Standard Model as such. The clock is not rotated with respect to the in- and outgoing particles but is presented to the observer in the upright way, XII on the top, therefore moving out from the rest of the image and representing the Standard Model that is the rock solid center piece of physics since many decades. The full variety of the standard model processes show up in the higher order corrections of the e+e- collisions, and the FCC-ee will probe them with unprecedented precision and be sensitive to new physics beyond the Standard Model.

Indeed, a deviation from the Standard Model can be made out in the image. The indicated time seems to be something close to 10:40, but the indicators are off. There is no possibility, even taking into account the error of the observation, of having the small indicator so close to XI while the large indicator is still at 20 minutes to XI. Clearly, a violation of the Standard Model to more than 5sigma significance is symbolized in this picture, and serves as a preview and motivation for the discovery potential of the FCC-ee collider.

Another interpretation that has been put forward refers to the to 'chain legs' in the picture as representing Patrick and Alain having a tight grip on the FCC-ee project. This idea is heavily disputed in the FCC management.

Eros Cazzato
To: Janot Patrick
RE: FCC-ee events and poster contest !

31 Jan 2016 17:10
Hide Details
25

Dear Patrick,

i'd like to submit my poster contest entry:

The FCC-ee will be mankind's most precise craftsmanship to discover and measure the laws of nature at the sub-atomic level. Its mode of operation is to send two high energetic and precisely adjusted electron beams in circular trajectories in order to collide and unleashing the energy in an explosion of particles. This explosion of particles is read by our detectors from which we base our chain of thoughts on in order to unveil the mist of new physics on which the foundation of physics will be laid.

Make your own judgement

philippe.schwemling@cea.fr 30 Jan 2016 22:52
To: Janot Patrick Hide Details
RE:FCC-ee events and poster contest ! 24

Bonsoir Patrick,

below is my reading of the poster.

The first things that jump to mind are the two groups of three chains. Each of these groups is made of three chains, arranged in the same way as the incoming and outcoming vertices of one of the very well known simplest Feynman diagrams representing the process e+e- --> e+e-. The chains are easily visible, carrying the message that the basic process (e+e- --> e+e-) is easy to see. The material used to make the chains looks like gold, suggesting the importance of the understanding of this basic process.

The two groups of chains, representing the initial and final states, are linked together by the case of a watch. The mechanism of the watch can be guessed. Some details of the watch are quite visible, like the hour, minute, and second hand, as well as a dial. The watch itself looks like the circle used to represent loops appearing in higher order processes. The fact that some of the details of the watch can be seen can be read as the fact that some of the higher order processes have effects that can be measured. More subtle details cannot be individualised, although it is clear they also have physical effect, as on the poster they contribute to the general visual impression.

In fact, the watch mechanism is a superimposition of several watch mechanisms, hinting at the complexity of higher-order processes. Understanding these processes is a long-term effort, as has been the development of reliable watch mechanisms. Watches are precises objects obeying to simple and precise mathematical and physical laws, that are combined in subtle ways to make together an object with a relatively simple global behaviour. The watch, especially in Switzerland, is a metaphor for precision and precision study of physics phenomena - remember the importance of precision timing in astronomy -

The circular shapes of the springs and wheels that can be seen hints at particle loops in Feynman diagrams, springs and wheels with different sizes hints at the different energy and order of magnitude of the different higher-orderprocesses.

The outline of the watch case looks like a loop in a Feynman diagram, and also like a rough driving of a collider, with four interaction regions. It may be a reminiscense of LEP, with many of the physics topics that could be studied there arranged around the watch case. To name a few, I see M_Z, M_W, alpha_s(M_z), alpha_{QED}(M_z). These were all precision measurements.

Further around are other physics topics mentioned, in a somewhat different and bigger font. These physics topics represent still open questions, that could be studied with a collider with a greater radius than LEP, be it FCC-hh for direct discovery or FCC-ee for precision measurements hinting at new phenomena. Since these topics are still open, they are somewhat further away from the watch than the ones studied at LEP, and also because they need a bigger collider to be studied. They are in a bigger font because they are now more present in the mind of physicists than past measurements.

Finally, all that stands above a background with a wavy pattern that looks at places like an interference pattern, and at places like a groups of caustics, as would look a regular geometrical pattern seen through the waves of a water pool. This could represent the difficulty we have understanding the pattern of space and time, that may be simple after all, but is for now obscured by the complexity of the processes we observe and by the difficulty of the calculations.
The structure of space and time is what we want to understand in the end, and this is why everything in the picture stands on or above it.

The wavy pattern changes colors among the picture, but with always more or less the same spatial structure. Maybe this is a metaphor for the different energy scales at which we have to work to understand the various phenomena.

Make your own judgement

Mogens Dam
To: Janot Patrick
poster contest

13 Jan 2016 16:16
Hide Details

My observation:

You need a loop to investigate loops.
A linear collider would only do Born level.