

# **Report from Physics Coordinator**

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# News

## **Yet Another Document Expected from JHEPC**

To be completed in March 2017  
Japanese HEP committee is planning to issue  
a statement on the ILC physics case  
based on the LHC Run2 results (so far).

**The recommendation by the MEXT panel**  
*Closely monitor, analyze, and examine the development of LHC experiments*

**The current LHC Run2 results**  
indicate that there seem to be *no new particles easily discoverable at the LHC*, which leaves the two cases on the next slide (attachment to the report from the physics WG of the MEXT panel).

# Item 3: Table (Attachment to the Report)

## ILC's Vision based on results from the 13TeV LHC run

Research at ILC based on 13TeV LHC results	Expected change according to the 13TeV LHC results		Notes
	Scientific case of 500GeV ILC	ILC's international appeal	
<b>1. New physics study through direct searches for new particles that go beyond the standard model such as SUSY particles</b>			
<i>In the case where a new particle is found at the LHC, but the chance to directly access corresponding new particles at ILC is <b>low</b>:</i>	△	○ / △	<i>In this case energy upgrade of ILC will be needed eventually. ILC's international appeal may or may not go down depending on how people evaluate prospects for the energy upgrade.</i>
<i>In the case where a new particle is found at the LHC, and the chance to directly access corresponding new particles at ILC is <b>high</b>:</i>	◎	◎	<i>In this case ILC is expected to make a very significant scientific impact in elucidating the properties of these new particles and hence its attractiveness will be greatly enhanced.</i>
<i>In case no new particle is found at the LHC</i>	△	○ / ◎	<i>In this case the mass range of new particles accessible by the 500GeV ILC will be reduced. Since ILC is sensitive to different kinds of new particles, ILC's attractiveness will not change or may even increase.</i>
<b>2. Search for new physics beyond the standard model through precision measurements of the Higgs boson and the top quark</b>			
<i>In the case where a new particle is found</i>	○ / ◎	○	<i>In this case we will need the precision measurements to identify new physics models and that deviations from the standard model become more likely to be seen. Some say this will enhance ILC's scientific case, while others say the scientific case for the precision measurements is independent of what the LHC will find and hence will not change.</i>
<i>In case no new particle is found at the LHC</i>	◎ / ○	◎	<i>In this case there will be no means other than ILC. Some say this will enhance ILC's scientific case while others say it will not change. If the centripetal force of LHC is diminished, precision measurements at ILC will become relatively more attractive as a approach to physics beyond the standard model.</i>

- (1) Change in ILC's scientific significance and appeal as of now: ◎ greatly enhanced, ○ unchanged, △ slightly lowered.
- (2) In the case where a new particle found at LHC turns out to be a strongly interacting SUSY particle, the mass of the lightest new particle directly accessible at ILC is about 1/7 of its mass (the mass could be even lighter due to mixing).
- (3) The upper limit of the mass reach for a new particle searchable by the 13TeV LHC is 2TeV (2000GeV). The upper limit of the mass reach of direct search for new particles at the 500GeV ILC is 250GeV. (LHC's new particle searches at 8TeV resulted in no new strongly interacting particle discovered below 1TeV).

**There were split opinions among the physics WG of the MEXT ILC Advisory panel for the two cases that LHC Run2 data suggest likely.**

**JHEPC wants to deliver a clear single voice message.**

**LCC physics WG's new particle discovery potential document will be inputs to this.**

# ***Physics focus schedule***

- Sep 14: Higgs/EW: **today**
- Sep 21: **General ILD Meeting**
- Oct 5: BSM **today**
- Oct 19: Top/QCD
- Nov 2: Higgs/EW
- Nov 16: BSM
- Nov 30: LCWS preparation

## Clarification:

Software talks (organised by Frank&Akiya) will come in addition, as well as the overall software and physics coordination updates in the beginning of each meeting.

## ***Subgroup meetings***

Sep. 28: first Higgs/EW group meeting