

ILC Symposium

Introduction

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Current status of particle physics

- The SM was established by collider experiments
- No new particle found up to now
- Many problems of the SM, such as neutrino mass, dark matter, baryogenesis, inflation, hierarchy, unification, gravity, ...

Higgs must be an important portal for new physics

Higgs sector

Mass generation mechanisms

Higgs Mechanism

hWW

hZZ

Yukawa Coupling

$h\tau\tau, hbb$

htt, \dots

Dim. 6 Operators

hgg

$h\gamma\gamma$

$$L_{eff} = |D_\mu \Phi|^2 - y L \Phi R - 1/v^2 |\Phi|^2 GG$$

$$- V_{eff}(\Phi)$$

hhh

$hhhh$

EW Symmetry Breaking

EW Phase Transition

Higgs sector

Confirmed!!

Mass generation mechanisms

Higgs Mechanism

Yukawa Coupling

Dim. 6 Operators

hWW

$h\tau\tau, hbb$

hgg

hZZ

htt, \dots

$h\gamma\gamma$

$$L_{eff} = |D_\mu \Phi|^2 - y L \Phi R - 1/v^2 |\Phi|^2 GG$$

Consistent with the SM, but

$$- V_{eff}(\Phi)$$

possibilities of detecting deviations by further precision measurements

$V=246\text{GeV}$

hhh

$M_h=125\text{GeV}$

$hhhh$

EW Symmetry Breaking

EW Phase Transition

Higgs sector

Mass generation mechanisms

Higgs Mechanism

Yukawa Coupling

Dim. 6 Operators

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$h\gamma\gamma$

$$L_{eff} = |D_\mu \Phi|^2 - y L \Phi R - 1/v^2 |\Phi|^2 GG$$

$$- V_{eff}(\Phi)$$

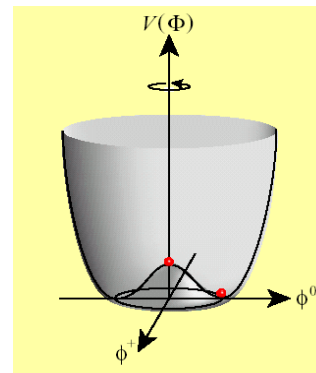
$V=246\text{GeV}$

$M_h=125\text{GeV}$

hhh

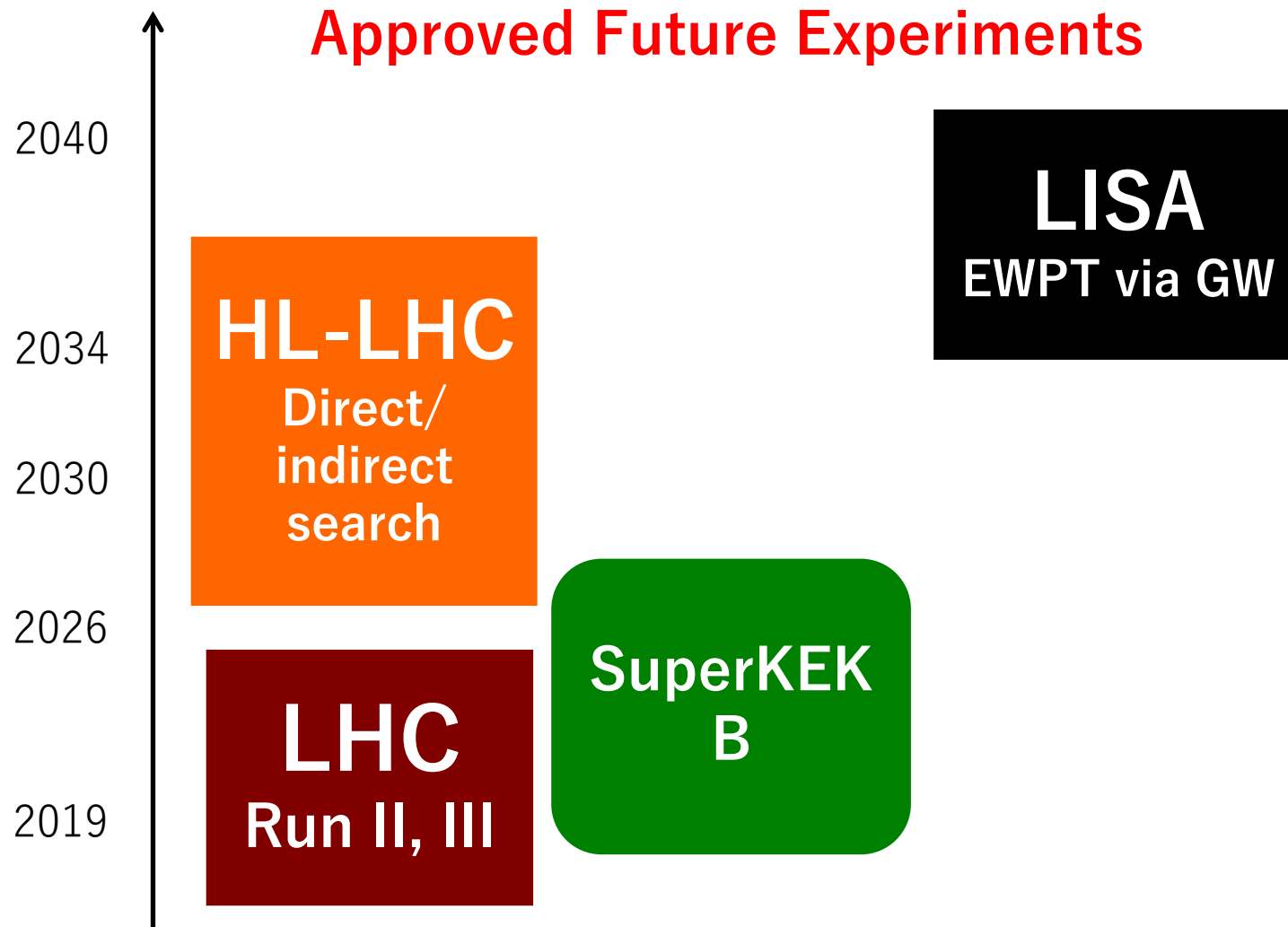
$hhhh$

EW Symmetry Breaking
EW Phase Transition

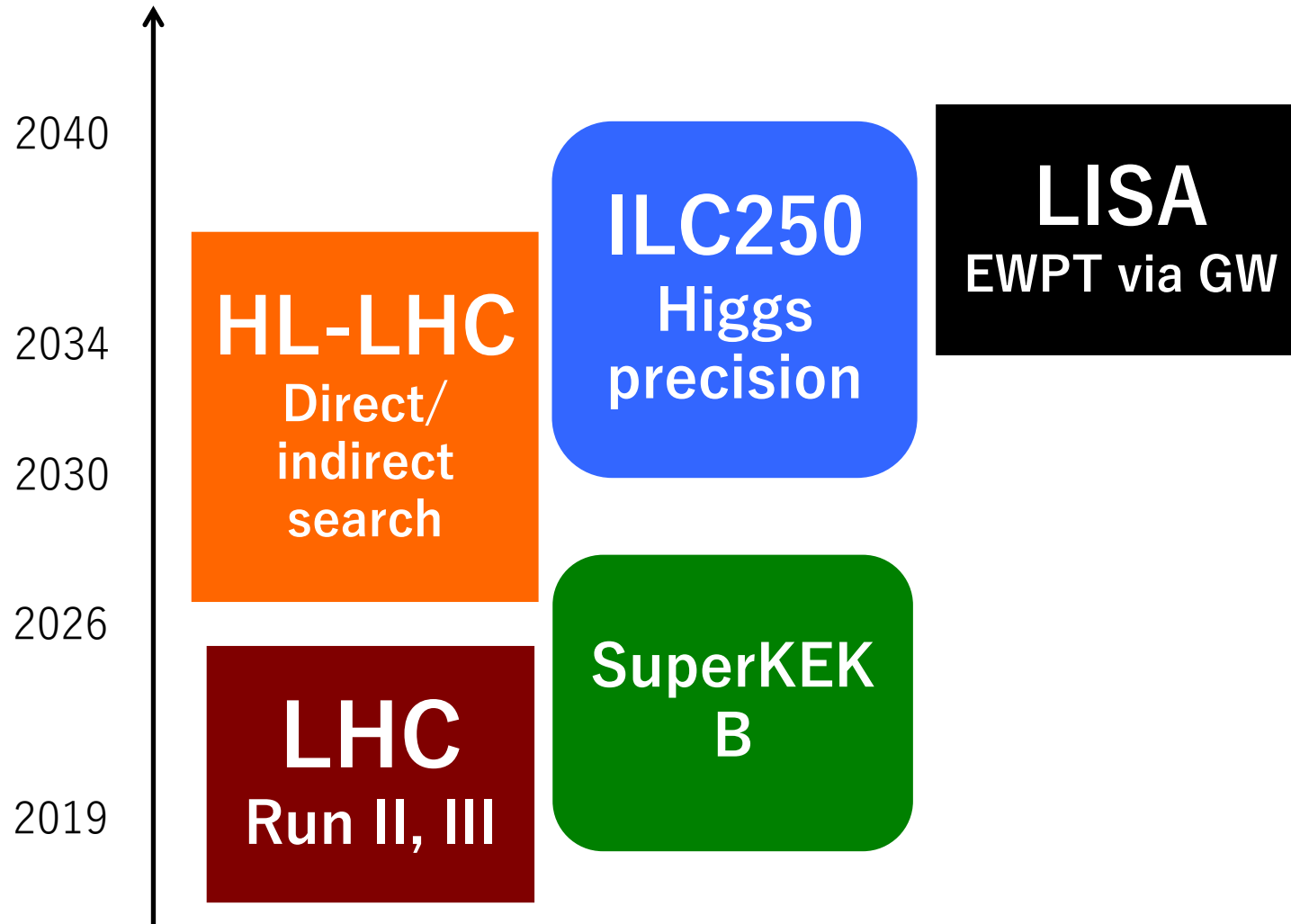


**Yet to be
Confirmed**

Future experiments



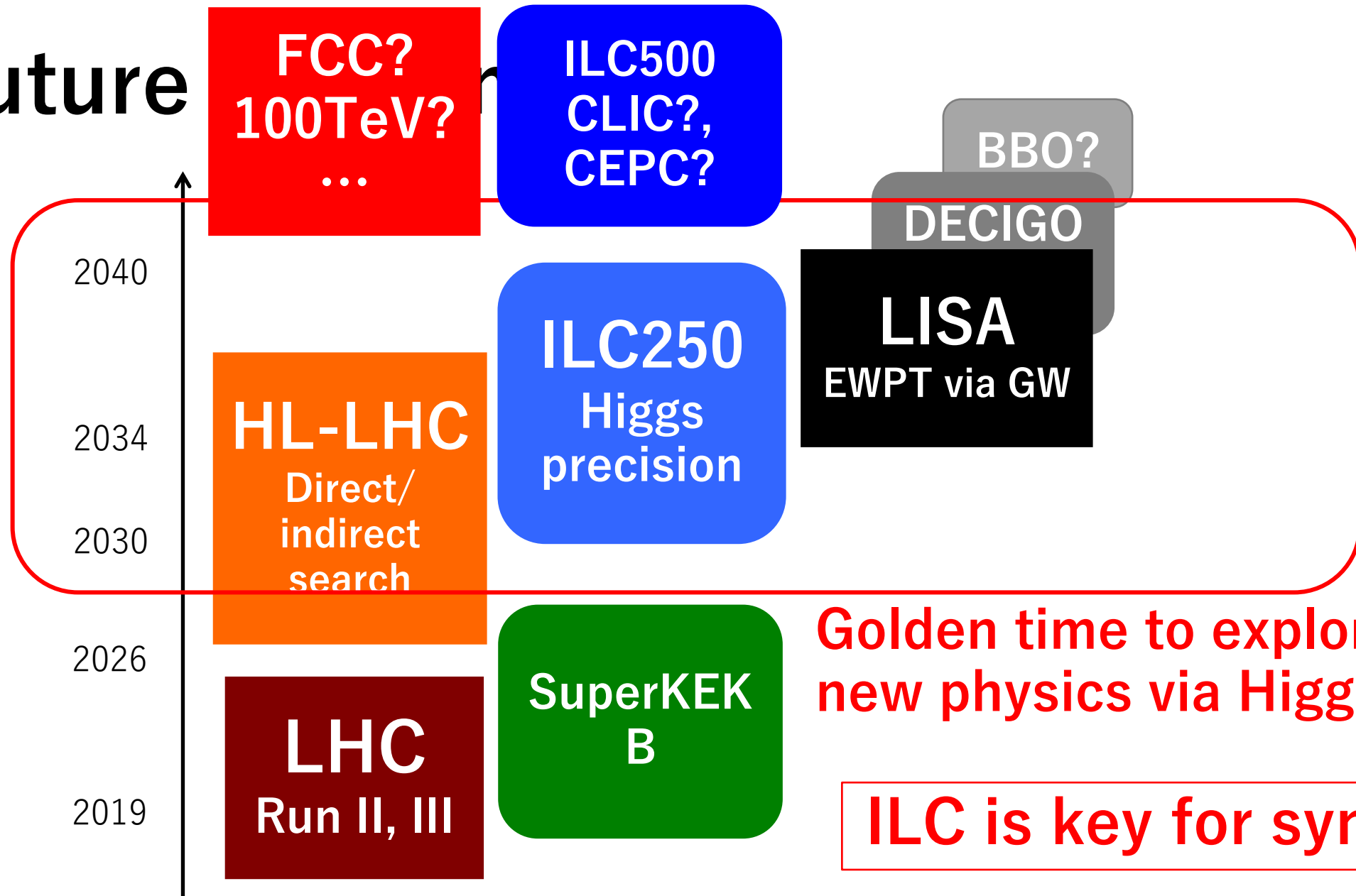
Future experiments



Future experiments



Future



Golden time to explore new physics via Higgs

ILC is key for synergy

Why the ILC symposium at HPNP2019?

- We definitely want a high-energy lepton collider
- In particular, ILC250 is designed as a Higgs factory, which should be technically ready
- ILC Project has already a long history, but TODAY it is the really important timing for the realization of the ILC
- Under this circumstance, we believe it quite meaningful to hold a symposium for the ILC at HPNP2019, because here many Higgs experts from around the world meet together

ILC Symposium

- 1. ILC Project: Status and Prospect 20min.**
Yasuhiro Okada (KEK Director for Research)
- 2. Physics of ILC: Overview 30min.**
Keisuke Fujii (KEK)
- 3. ILC as a Higgs Factory: Higgs Precision 45min.**
 - EFT Junping Tian (U. of Tokyo)
 - Multi Higgs models Kei Yagyu (Osaka U.)
 - New Physics Eibun Senaha (IBS, Korea)
- 4. New Physics Searches 20min.**
Yutaka Hosotani (Osaka U.)
- 5. Panel Discussion 30min.** All presenters and you all

