From Far East

Mihoko M. Nojiri
KEK & IPMU

- “Japanese plan and status ” (For details you have to go to Hitoshi’s slide in Brookhaven April 5) + some updates

- and Physics(Most important)

Physicists

- JAHEP (Japan Association of High Energy Physicists) proposal + KEK load map. Proposal submitted to Science council of Japan in March
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- Upgraded ~500 GeV (ILC baseline)
- Technical expandability to ~1 TeV

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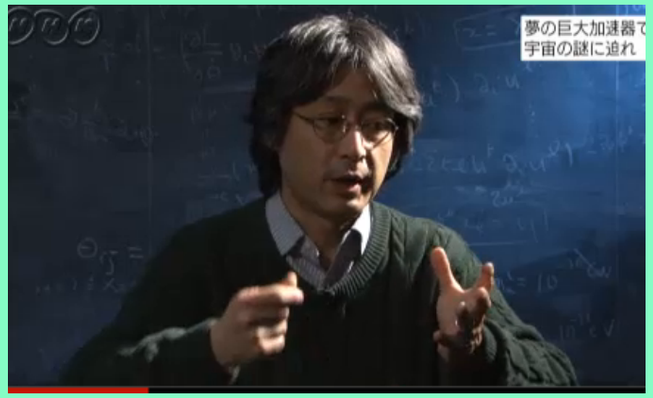
general public

Higgs,ν, B



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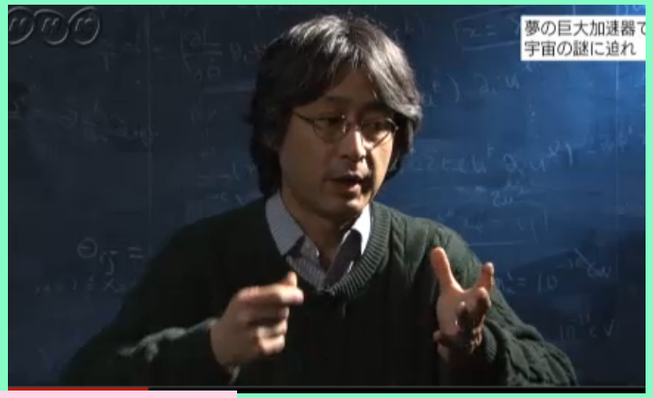

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Local governments
(site decision by Summer)
Industries
(Japan Policy council etc)

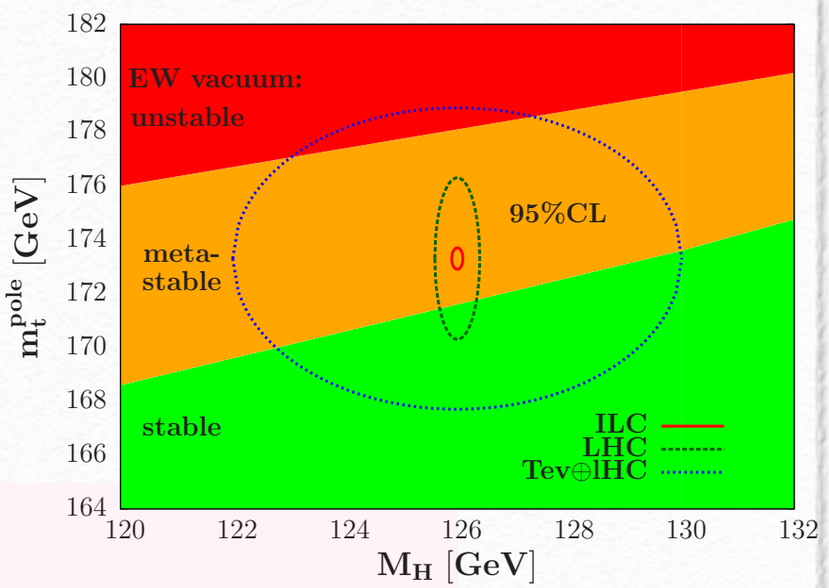
Physics of ILC

Is this outstanding project?

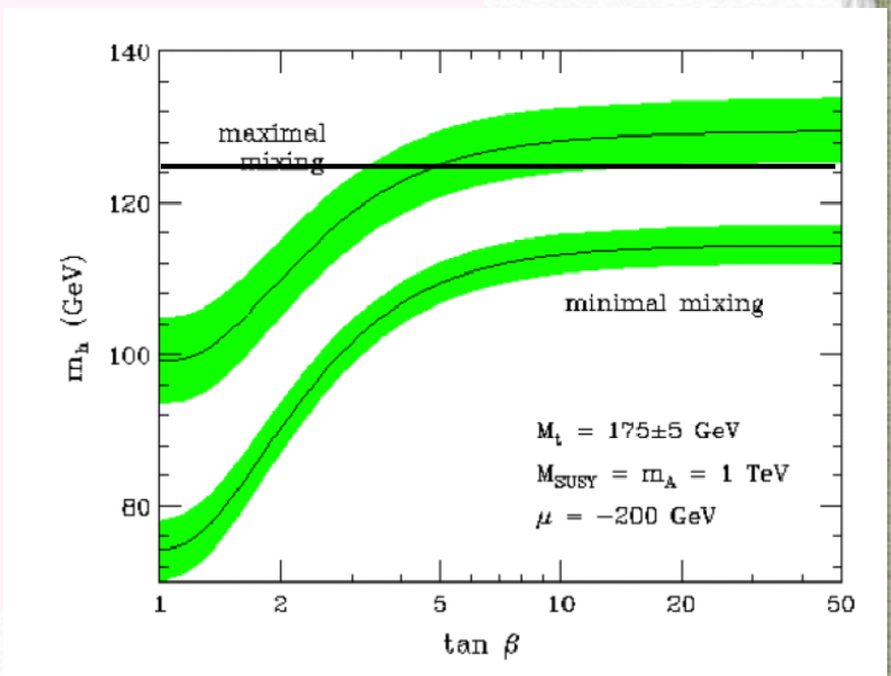
- Top physics
- Higgs Physics (Synergy)
- SUSY(dark matter) physics

top mass

and higgs sector

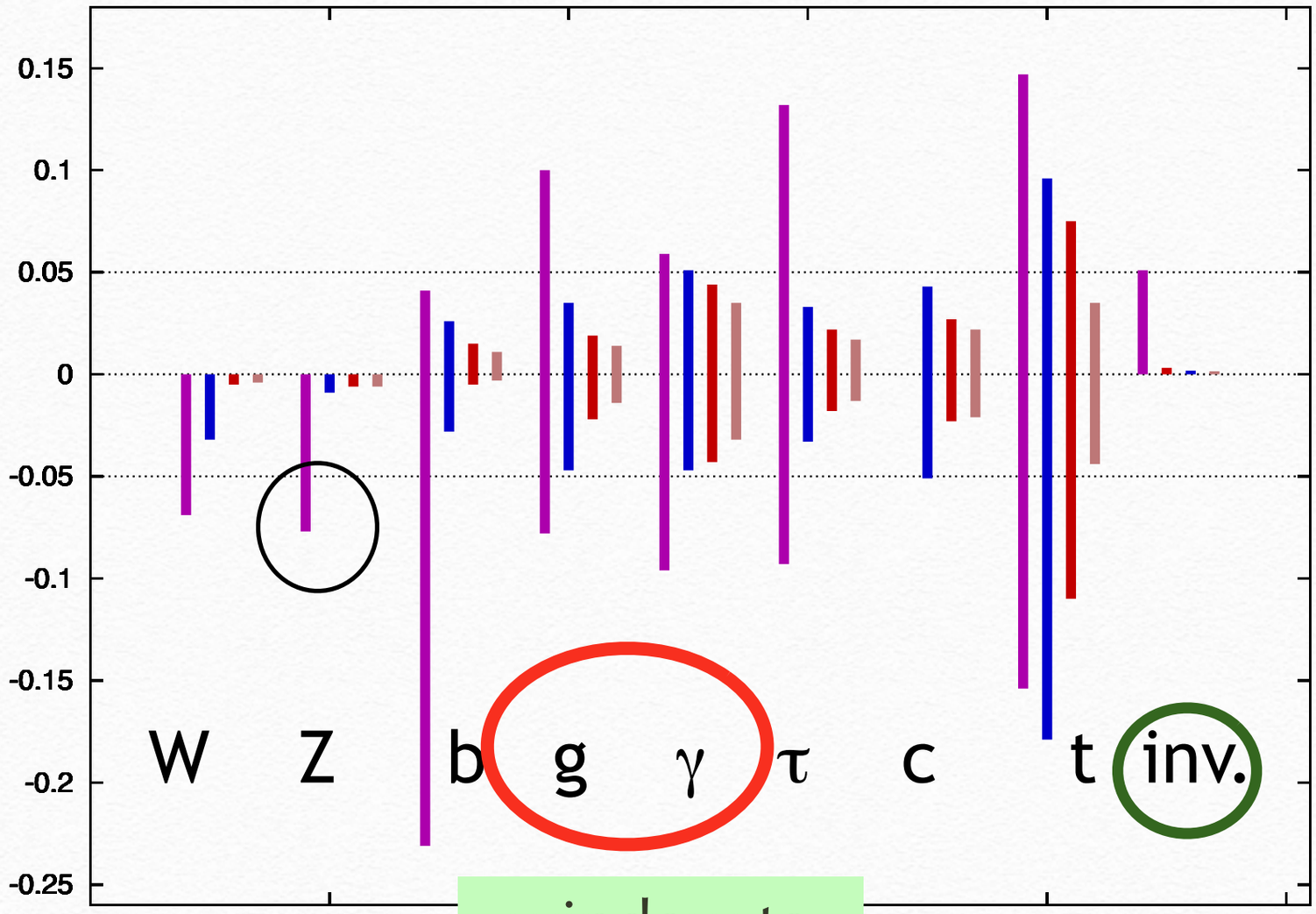


- Discovery and excitement
- Unstable vacua but perturbative up to Planck scale important to determine top mass (which we need ILC)
- Nothing excluded yet (but we fix our mind to future plan)
- facing challenge (especially SUSY)
  - Higgs mass too small to exclude SUGRA
  - some SUSY models has gone? GM, but thoese models can be extended.
  - fine turning is not absolute measure



Higgs Physics LHC(300fb^{-1})and ILC

$g(hAA)/g(hAA)|_{SM}$-1 LHC/ILC1/ILC/ILCTeV



window to virtual sector

0.7% for higgs branch (by Ishikawa) **Window to dark sector**

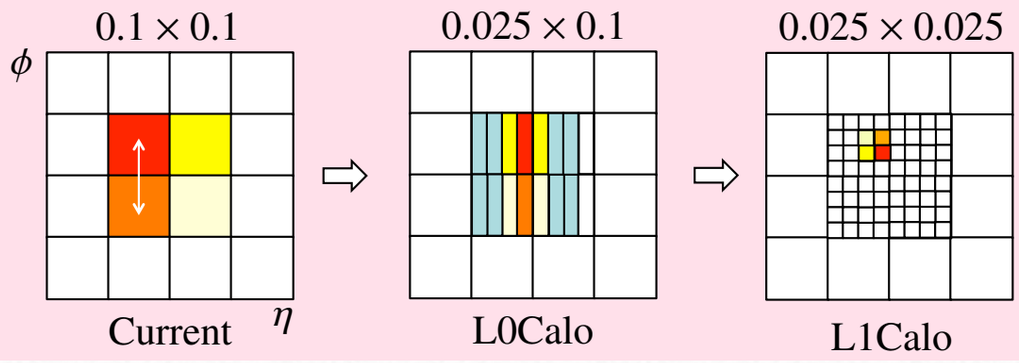
Figure 2.20. Estimate of the sensitivity c…son couplings in a model-independent analysis. The plot shows the 1 σ confide…the fit described in the text. Deviation of the central values from zero indicates a bias, which can be corrected for. The upper limit on the WW and ZZ couplings arises from the constraints (2.31). The bar for the invisible channel gives the 1 σ upper limit on the *branching ratio*. The four sets of errors for each Higgs coupling represent the results for LHC (300 fb^{-1}, 1 detector), the threshold ILC Higgs program at 250 GeV, the full ILC program up to 500 GeV, and the extension of the ILC program to 1 TeV. The methodology leading to this figure is explained in [65].

HL-LHC (1000->3000 fb^{-1})

- 2018年 14TeV L~$2x10^{34}$ $cm^{-2}s^{-1}$ 25ns (Phse 1)
- 2022年 L~$5x10^{34}$ $cm^{-2}s^{-1}$ (Phase II)
- strong intention to keep trigger as low as possible for Higgs physics

This is not free!

Ex ATLAS Ecal

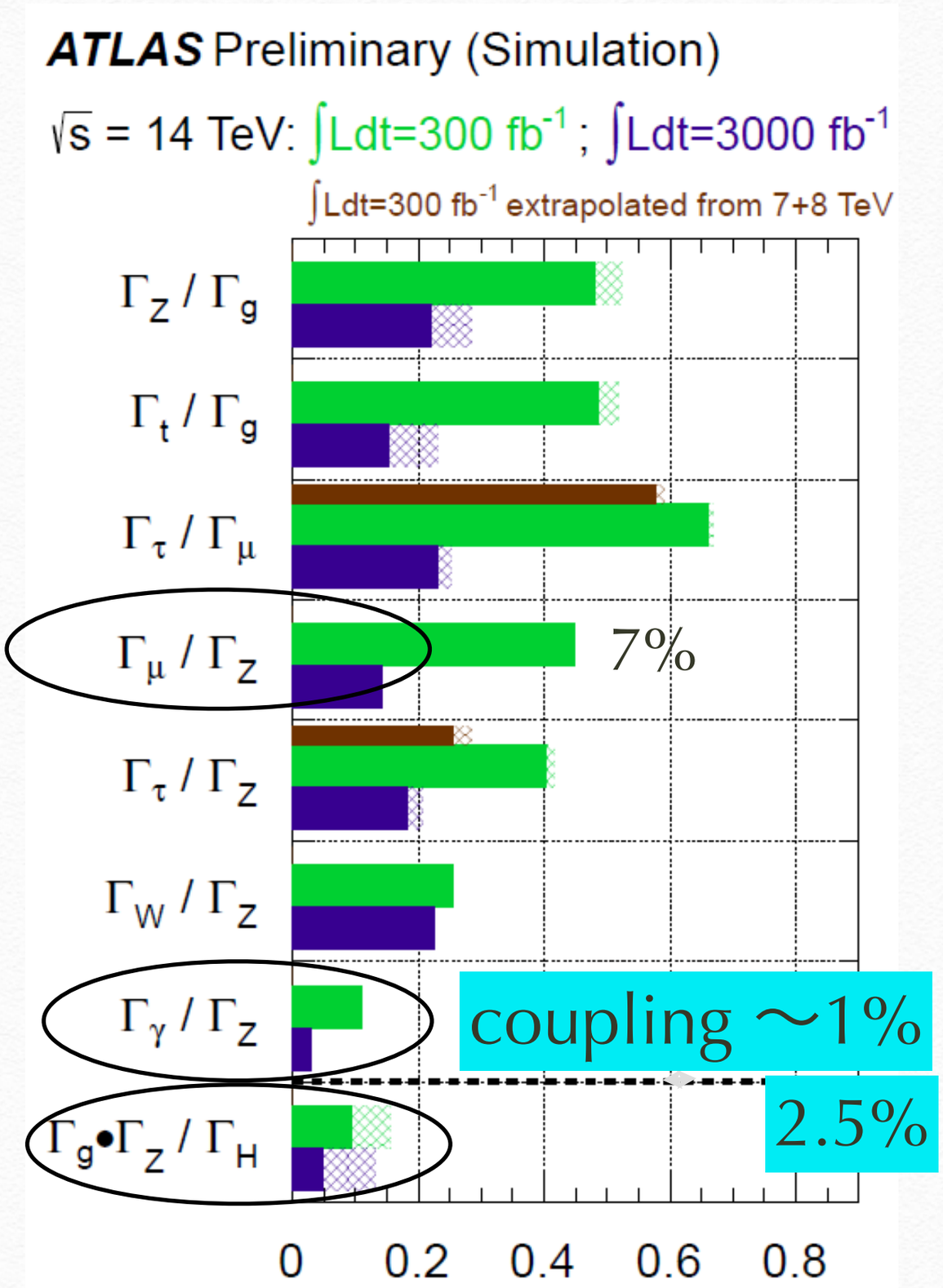


Muon....

muon new small wheel
for 1 mrad resolution

Figure 2.5: The EM granularity available in the current, Phase-II Level-0 and Phase-II Level-1 EM triggers.

Object(s)	Trigger	Estimated Rate	
		no L1Track	with L1Track
e	EM20	200 kHz	40 kHz
γ	EM40	20 kHz	10 kHz*
μ	MU20	> 40 kHz	10 kHz
τ	TAU50	50 kHz	20 kHz
ee	2EM10	40 kHz	< 1 kHz



Γγ/Γz ~2% error from HL-LHC phase2

⊕

ILC error of Z coupling 0.44% at 250GeV,

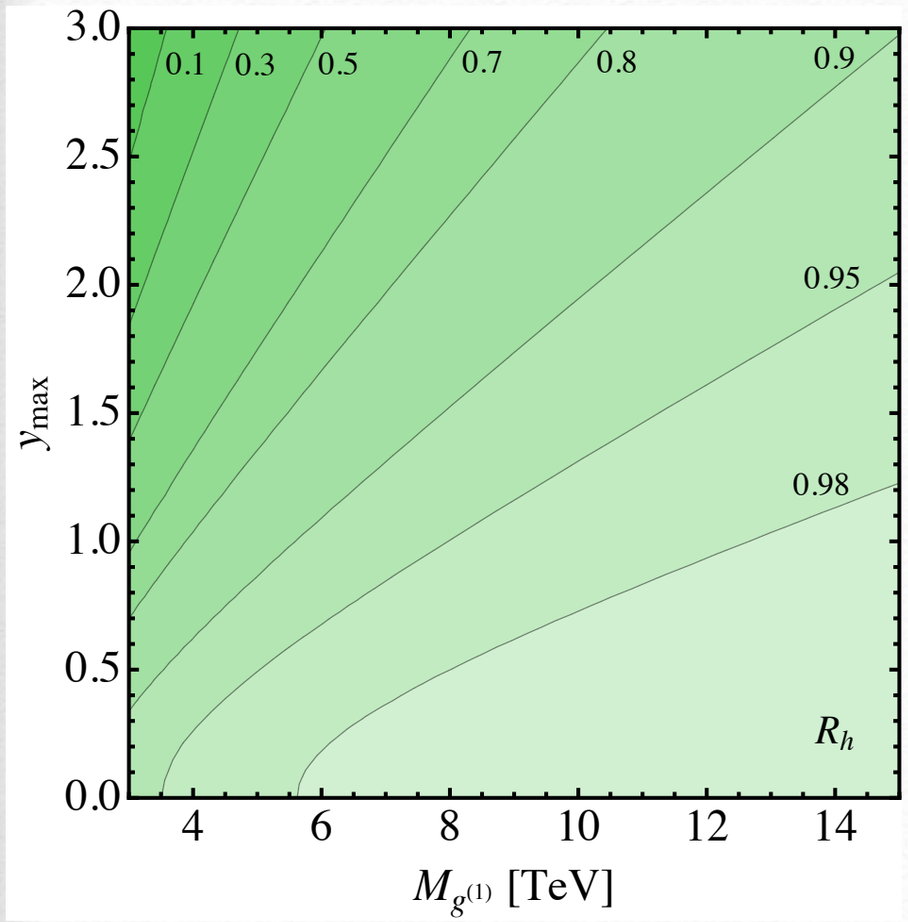
⇓

O(1%) loop physics

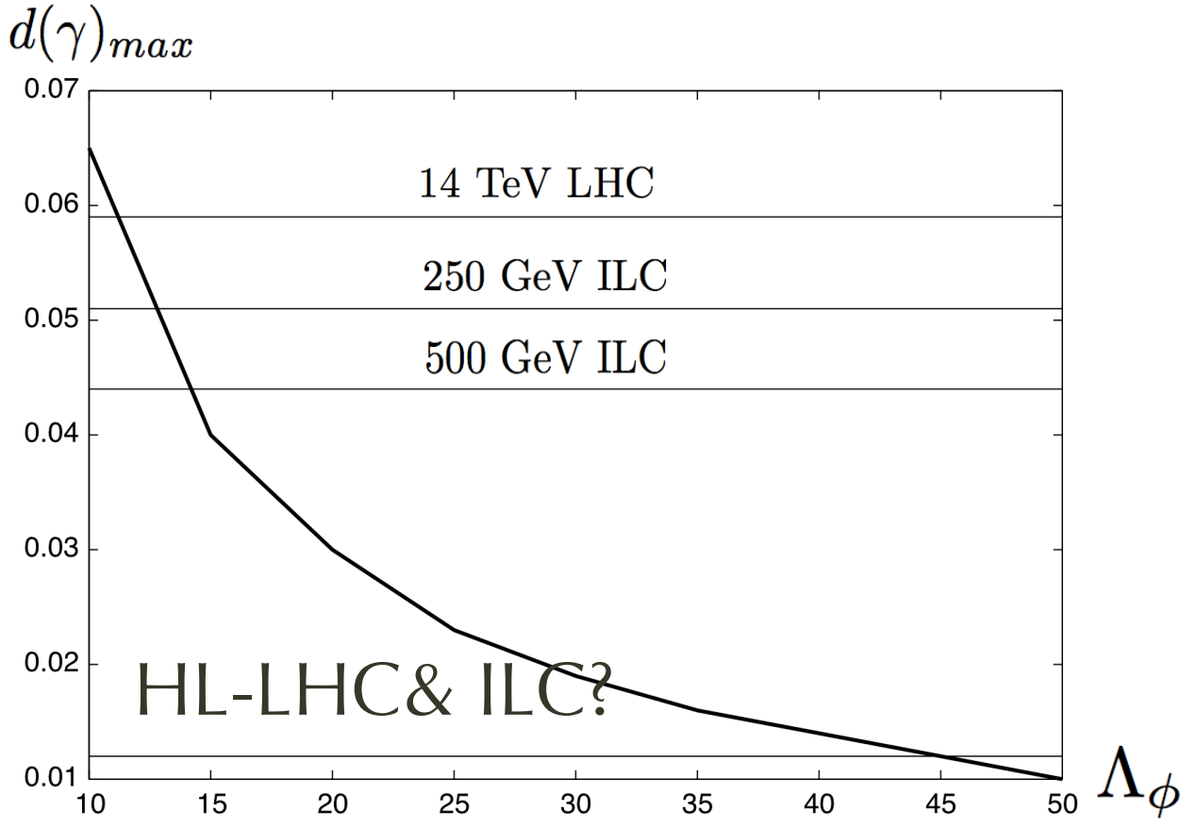
New physics scale and Higgs production and decay

correction to gg→ h production

Carena et al JHEP 1208(2012)156

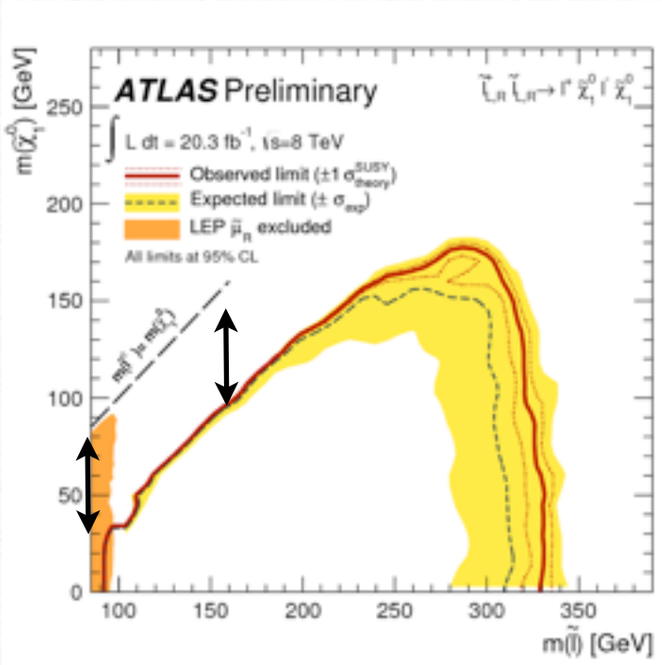


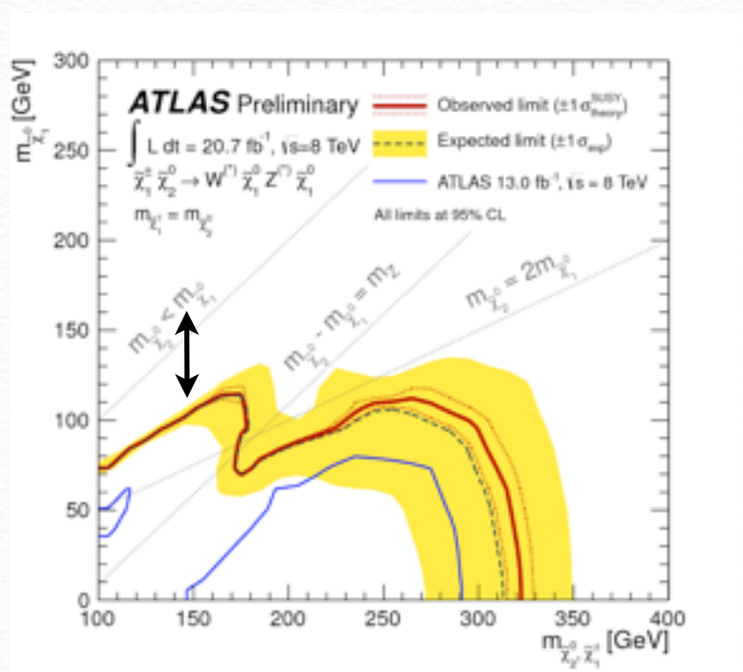
max correction to h->γγ coupling for higgs radion mixing scenario



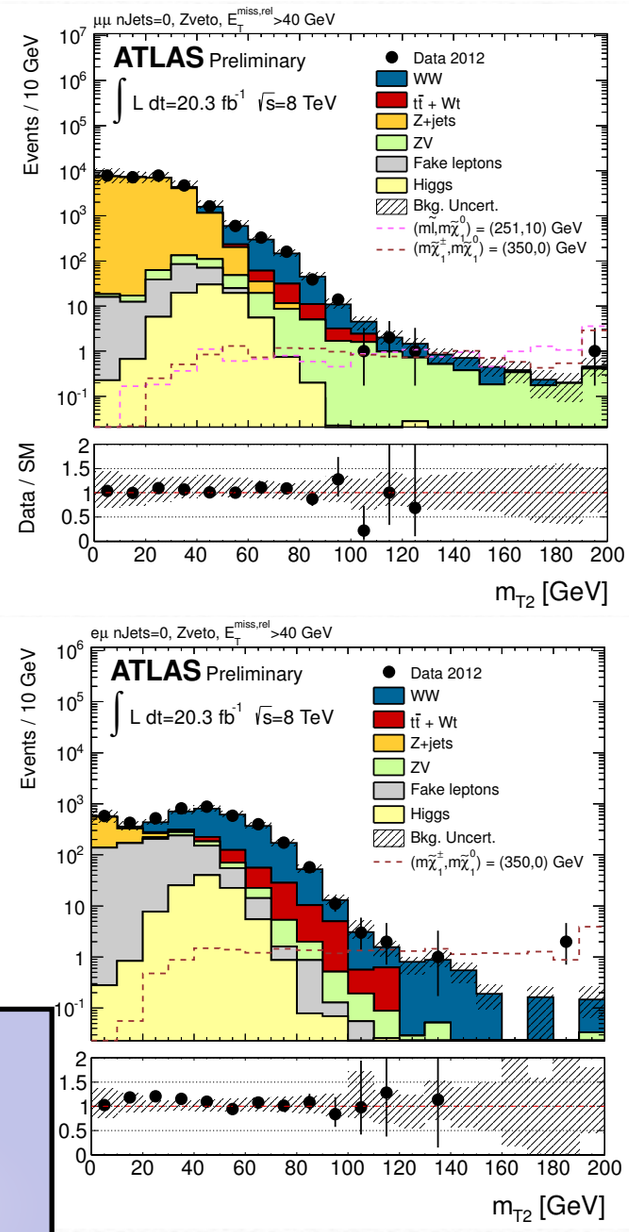
Kubota & Nojiri in progress

EW SUSY and dark matter





(d)



(f)

access to the higher mass at HL-LHC

provided low lepton threshold

Mass difference 50 GeV required due to the overlap with W and Z's

LHC seems not to sensitive about tau channel

ILC is more sensitive to those.

My view

- High Luminosity LHC must be supported. given success of LHC 7-8TeV
  - Success....Understanding of QCD and Standard model (multijet amplitude, higher order QCD correction)
  - Next target is a virtual higgs sector and dark matter sector..
  - US theory role - Future particle physics need new ideas (in the past, new models are from US, gauge mediation, anomaly mediation, extra dimension...)