

# *TOYAMA NODE*

*Shinya KANEMURA*

*U. of TOYAMA*

*Scalars 2015, 3–7 December 2015, Warsaw*

**Shinya Kanemura**

**Tokyo**

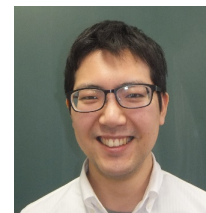
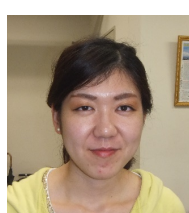
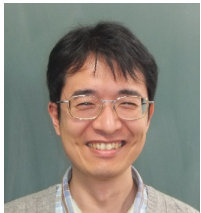


**TOYAMA**

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**1<sup>st</sup> RISE MEETING, 7. December 2015, Warsaw**

# Toyama Theoretical Physics Group



**Faculty:** Takeshi Kurimoto, Shinya Kanemura, Mitsuru Kakizaki

**Postdoc:** H. Sugiyama, M. Nakamura

**Ph. D Students:** M. Kikuchi, T. Matsui, N. Machida, A. Santa

**Master Graduate Students:** 7

**Undergraduate Students:** 10

# Main Research Field of each faculty

## Takeshi Kurimoto:

B, D, K physics, perturbative QCD, ...

## Shinya Kanemura:

Higgs Physics, Collider Physics,  
Models for Neutrinos, DM, Baryogenesis,  
[NHWG Chair, LCC Member, KAGRA Collaboration]

## Mitsuru Kakizaki:

Extra Dimension, SUSY Phenomenology, DM, Higgs  
Physics  
[NHWG Member, KAGRA Collaboration]

# Introduction

- Our group is one of the most active groups in Japan for phenomenological researches, especially on Higgs, LHC, ILC, TeV-scale models
- S. K. organizes **New Higgs Working Group**, which is composed of many domestic Higgs and TeV-model researchers in Japan (and Eastern Asia), holding regular meetings in Univ. of Toyama for every three months since 2012.
- HPNP conferences were held in 2013 and 2015

## Phenomenology of Higgs sectors

1. **Phenomenology of Georgi-Machacek model at future electron-positron colliders**  
C.-W. Chiang, S. Kanemura, K. Yagyu, arXiv:1510.06297
2. **Discriminating phenomenological features of scale invariant models for electroweak symmetry breaking**  
K. Hashino, S. Kanemura, Y. Orikasa, PLB 752 (2016) 217
3. **Indirect reach of heavy MSSM Higgs bosons by precision measurements at future lepton colliders**  
M. Kakizaki, S. Kanemura, M. Kikuchi, H. Yokoya, IJMPA30 (2015)33
4. **Searches for additional Higgs bosons in multi-top-quarks events at the LHC and the International linear collider**  
S. Kanemura, H. Yokoya, Ya-Juan Zheng, NPB 898 (2015) 286
5. **LHC Run-I constraint on the mass of doubly charged Higgs bosons in the same sign diboson decay scenario**  
S. Kanemura, M. Kikuchi, H. Yokoya, K. Yagyu, PTEP 2015 (2015) 051B02
6. **New resonance scale and fingerprint identification in minimal composite Higgs models**  
S. Kanemura, K. Kaneta, N. Machida, T. Shindou, PRD91 (2015) 115016
7. **Bounds on the mass of doubly-charged Higgs bosons in the same-sign diboson decay scenario,**  
S. Kanemura, M. Kikuchi, K. Yagyu and H. Yokoya, Phys. Rev. D 90, no. 11, 115018 (2014)
8. **Fingerprinting nonminimal Higgs sectors,**  
S. Kanemura, K. Tsumura, K. Yagyu and H. Yokoya, Phys. Rev. D 90, 075001 (2014)
9. **Complementarity in direct searches for additional Higgs bosons at the LHC and the International Linear Collider,**  
S. Kanemura, H. Yokoya and Y. J. Zheng, Nucl. Phys. B 886, 524 (2014)

## Radiative corrections to Higgs boson couplings in extended Higgs sectors

1. **Radiative corrections to the Higgs boson couplings in the model with an additional real singlet scalar field**  
S. Kanemura, M. Kikuchi, K. Yagyu, arXiv: 1511.06211
2. **Fingerprinting the extended Higgs sector using one-loop corrected Higgs boson coupling constants and future precision measurements,**  
S. Kanemura, M. Kikuchi, K. Yagyu, NPB896 (2015) 80
3. **Radiative corrections to the Yukawa coupling constants in two Higgs doublet models**  
S. Kanemura, M. Kikuchi, K. Yagyu, PLB731 (2014) 27,

## Models for neutrino mass, DM, baryogenesis, inflation

1. **Probing Models of Neutrino Masses via the Flavor Structure of the Mass Matrix**,  
S. Kanemura and H. Sugiyama, arXiv:1510.08726 [hep-ph].
2. **Gravitational waves as a probe of extended scalar sectors with the first order electroweak phase transition**,  
M. Kakizaki, S. Kanemura and T. Matsui, arXiv:1509.08394 [hep-ph]. Phys. Rev. D to appear
3. **R-Parity Conserving Supersymmetric Extension of the Zee Model**,  
S. Kanemura, T. Shindou and H. Sugiyama, Phys. Rev. D 92, no. 11, 115001 (2015)
4. **Beam dump experiment at future electron–positron colliders**,  
S. Kanemura, T. Moroi and T. Tanabe, Phys. Lett. B 751, 25 (2015).
5. **Radiative neutrino mass, dark matter and electroweak baryogenesis from the supersymmetric gauge theory with confinement**,  
S. Kanemura, N. Machida and T. Shindou, Phys. Lett. B 738, 178 (2014)
6. **Neutrino mass and dark matter from gauged  $U(1)_{B-L}$  breaking**,  
S. Kanemura, T. Matsui and H. Sugiyama, Phys. Rev. D 90, 013001 (2014)

# Activity regarding ILC

SK has been involved by various activity of supporting the ILC projects

- LCC member
- Convenors of LCWS, ACFA, ...
- Technical Design Report
- WG reports

Toyama Group will continue to be active for the ILC project and explore physics which is testable there



# Activity regarding KAGRA

- Toyama is the closest university to the Kamioka Observatory Facility,  
Super Kamiokande, KamLAND, ....
- KAGRA is a Gravitational Wave interferometer which is preparing
- Toyama Group (SK and MK) joined KAGRA Collaboration
- Wrote a theory paper regarding GW.

# Schedule

**Nothing concrete**

**Regular Meeting of NHWG is held every 3months in Toyama**

**Although not yet considered, we would like to have the third conference in Toyama,**

**HPNP2017 “Higgs as a Probe of New Physics 2017”**

**(Winter or Spring season in 2017?)**

**Winter: Nice fishes, having much snow**

**Summer: Mountaineering**