Brief Overview of N-ken

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N-ken @ Nagoya Univ.

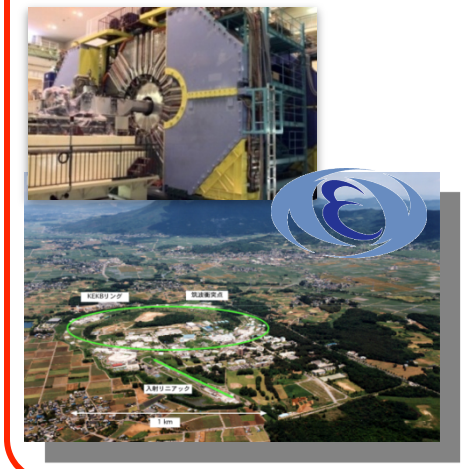
- Members as of 2017.10
  - Prof. 1, Assoc. Prof. 2, Assist. Prof. 1, Lec. 1
  - DC5, MC11, B4:6
  - Secretary 1

- KMI
  - Assoc. Prof. 3, Assist. Prof. 1, Postdoc 1
  - Secretary1

Research at N-ken

Energy Frontier（LHC）+ Luminosity Frontier（B−factory）

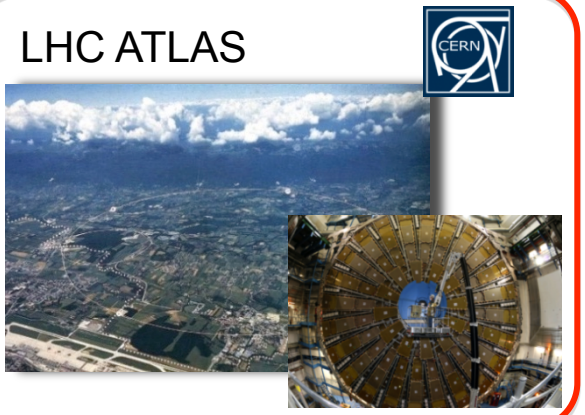
KEK Belle → Belle II



3rd generation

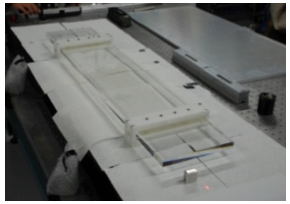
Bottom
Tau

LHC ATLAS



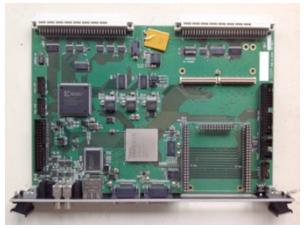
Development of advanced detectors

TOP Counter

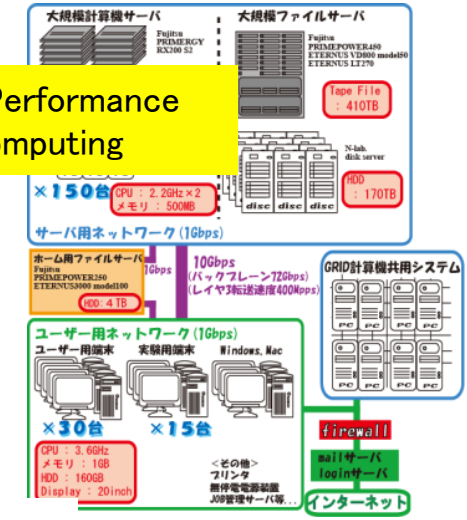


Photodetector

Trigger



High Performance Computing



Cooperation w/ Theory

Tau-Lepton Physics Research Center (2008)

Nagaya University
Tau Lepton Physics Research Center

Two Approaches to NP

2005 2010 2015 2020 2025

Confirmation of SM (KM + Higgs)

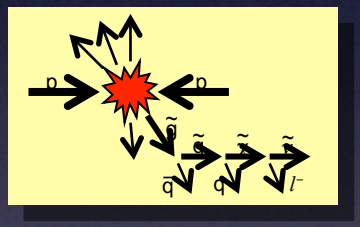
BSM: Physics beyond the SM (SUSU, e-DIM, …)

"Revolution of particle physics"

High Energy Frontier

LHC 7-8 TeV 13-14 TeV

Direct search

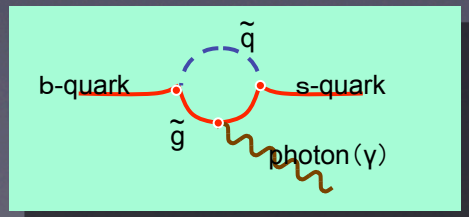


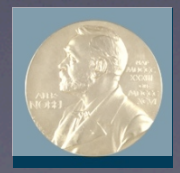
Nobel prize for experimentalists !

High Intensity Frontier

KEKB $2.1 \times 10^{34} cm^{-2} s^{-1}$ **Super KEKB** $8 \times 10^{35} cm^{-2} s^{-1}$

Indirect search (loop)





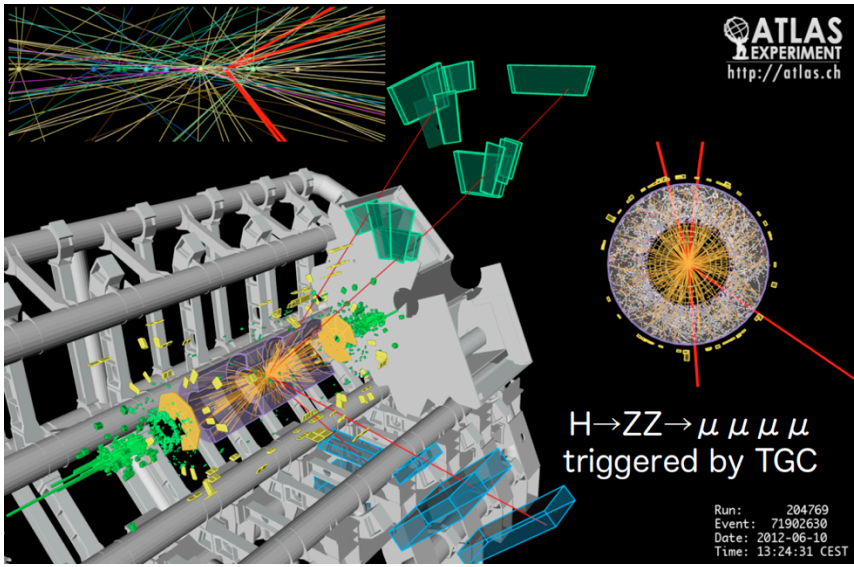
ATLAS - Nagoya


宿谷


水越

- ATLAS-Nagoya started in 2006, and grown-up to one of leading teams in Japan.
- Major contributions
  1. Installation/commissioning/operation of detectors
     - Endcap muon trigger (TGC)
  2. Physics analysis of Run1 data
     - Top quark physics
     - New Physics searches
  3. Upgrade towards high luminosity LHC
     - Advanced muon trigger system

若林　川出　戸本　堀井

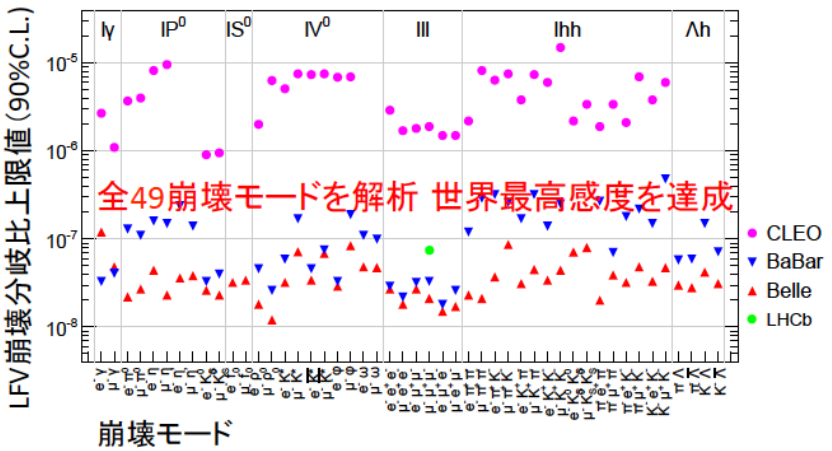


"Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC", Phys. Lett. B 716 (2012) 1-29 (cite:4343)

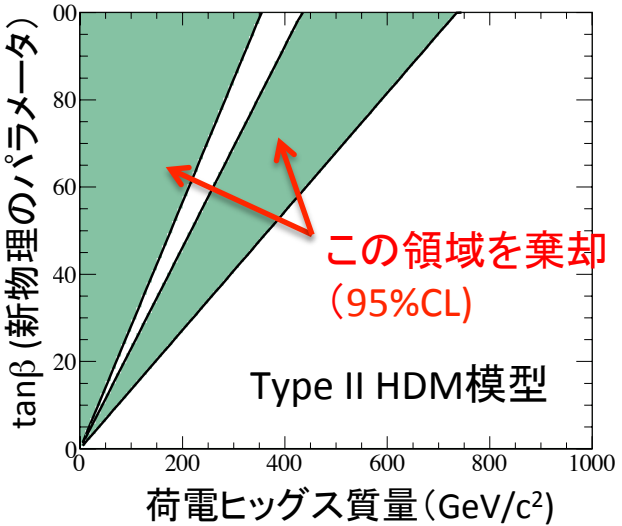
Belle/Belle II - Nagoya

- One of the largest university groups in Belle/Belle II
- Major contributions
  1. **Tau physics**
     - LFV decays
     - Tau EDM
     - Hadronic decays
  2. **B physics**
     - Semileptonic decays → Vxb
     - Tauonic decays (B → t n, D t n)
  3. **Barrel PID (TOP) for Belle II**
  4. **Computing**

Belle におけるタウLFV探索結果

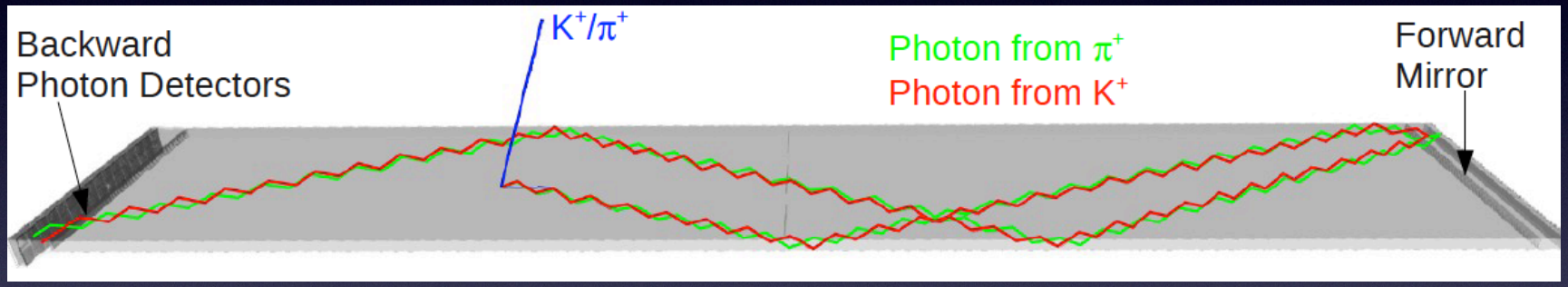


B→τν 荷電ヒッグス探索結果

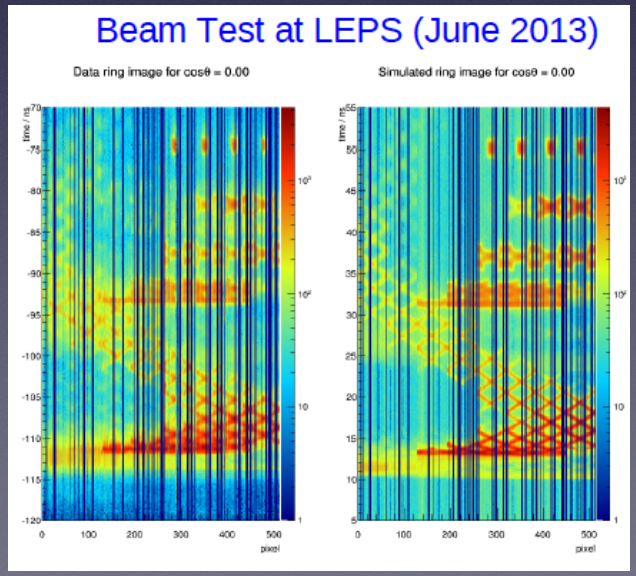


TOP Counter (PID)

- Time-Of-Propagation (TOP) technique: precision timing of internally reflected Cherenkov photons produced in accurately polished quartz radiator (~50ps/photon).



- Key technologies;
  - MCP-PMT and electronics to detect single photon with ~ 50ps resolution.
  - Accurately polished quartz optics, and mechanics.
- Performance has been demonstrated with a beam test at Spring-8.



Research at KMI

World Research Unit for Heavy Flavor Particle Physics

- 名古屋大学研究大学強化促進事業 最先端国際研究ユニット
- N.U. Program for Promoting the Enhancement of Research Universities （Menu B-1, WPI-next）
- Exploring new physics beyond the standard model by using experimental data on heavy flavor particles, expected in the coming years, and related theoretical studies.

B factory (Belle/Belle II)

Toru Iijima
- B & Tau physics
- Exotic hadron physics

LHC-ATLAS

Makoto Tomoto
- Top physics
- Higgs physics

Theory

Junji Hisano
- Flavor physics
- Dark matter physics

Foreign Researcher
Peter Krizan (Ljubljana)
(Visiting Professor)

Also will boost KMI Research and Globalozation