# Thoughts on software development in Japan and KEK

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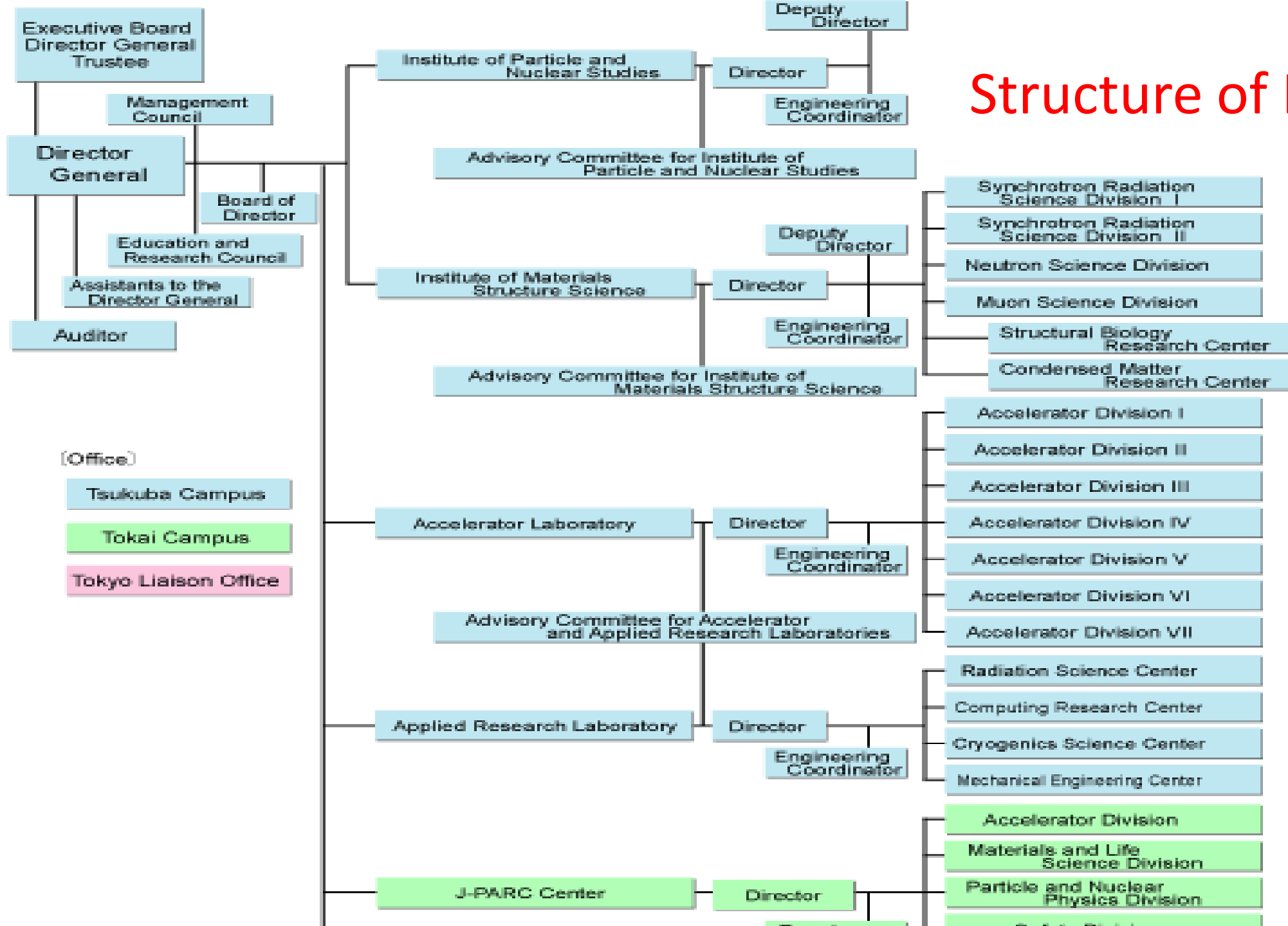
# Disclaimer

- The views and opinions expressed in this presentation are those of mine and do not necessary reflect those of my employer

- I am affiliated with KEK, but not representing them

# Background

- KEK is an inter-university research institute cooperation
  - As well as other national universities in Japan, KEK is on the way to privatization but not free from the government restrictions
  - Still almost 100% government funded laboratory
- There is no real engineer positions in universities and KEK, but only technicians
  - This is due to the employment system of the government
- Some part of researchers in KEK have duties which usually engineers do at other lab. (similar to teaching duties in universities)
  - Instead freedom of choice of own research topics are given as far as they obtain their research budget externally
  - KEK has an academic ranks system similar to the universities and researchers may become a PI for applying to external research grants
  - We are allowed to maintain copyright for software by ourselves as well as university professors

# Structure of KEK

Executive Board
Director General
Trustee

Management Council

Director General

Board of Director

Education and Research Council

Assistants to the Director General

Auditor

(Office)

Tsukuba Campus

Tokai Campus

Tokyo Liaison Office

Institute of Particle and Nuclear Studies — Director — Deputy Director

Engineering Coordinator

Advisory Committee for Institute of Particle and Nuclear Studies

Institute of Materials Structure Science — Director — Deputy Director

Synchrotron Radiation Science Division I

Synchrotron Radiation Science Division II

Neutron Science Division

Muon Science Division

Engineering Coordinator

Structural Biology Research Center

Condensed Matter Research Center

Advisory Committee for Institute of Materials Structure Science

Accelerator Laboratory — Director

Accelerator Division I

Accelerator Division II

Accelerator Division III

Accelerator Division IV

Engineering Coordinator

Accelerator Division V

Accelerator Division VI

Accelerator Division VII

Advisory Committee for Accelerator and Applied Research Laboratories

Applied Research Laboratory — Director

Radiation Science Center

Computing Research Center

Cryogenics Science Center

Engineering Coordinator

Mechanical Engineering Center

EGS and PHITS
Geant4

J-PARC Center — Director

Accelerator Division

Materials and Life Science Division

Particle and Nuclear Physics Division

# Current Japanese situation

- No one is working for HEP software development by job orders in Japanese universities nor KEK
  - People in Geant4 team in KEK who belong to Computing Research Center are hired for duties on purchase, deployment, operation of IT systems originally
    - Large part of actual works are outsourced to companies so far
  - They are working for Geant4 using their spare time according to their research interests
- In my opinion, KEK management people had less interests on computing and software than accelerator and detector constructions historically
  - KEK has no section to develop/support software in experiments

Accelerator

Historic view

Detector

Computing

High

priority

Low

# Geant4 Japan

- Founded 20 years ago following SDC@SSC activities
  - Rune, Katsuya and myself met at CHEP1994 in San Francisco (April 1994)
  - We agreed to start the new joint efforts between KEK and CERN
- Very loosely coupled collaboration among professors and researchers in universities and KEK(mostly permanent people)
  - People from different fields made Geant4 rich in functionality and area of applications
    - Computer scientists, physicists, medical physicists and so on
- We still work for Geant4 enthusiastically even after 20years of the history
  - We have lots of users in the different fields depending on Geant4
  - Efforts on a GPU version are made in parallel of Geant4 activities
- Because of research interests driven collaboration, real costs (money) consumed were smaller compared with efforts paid for Geant4 development
  - People used their time unlimitedly because they worked according to their research interests
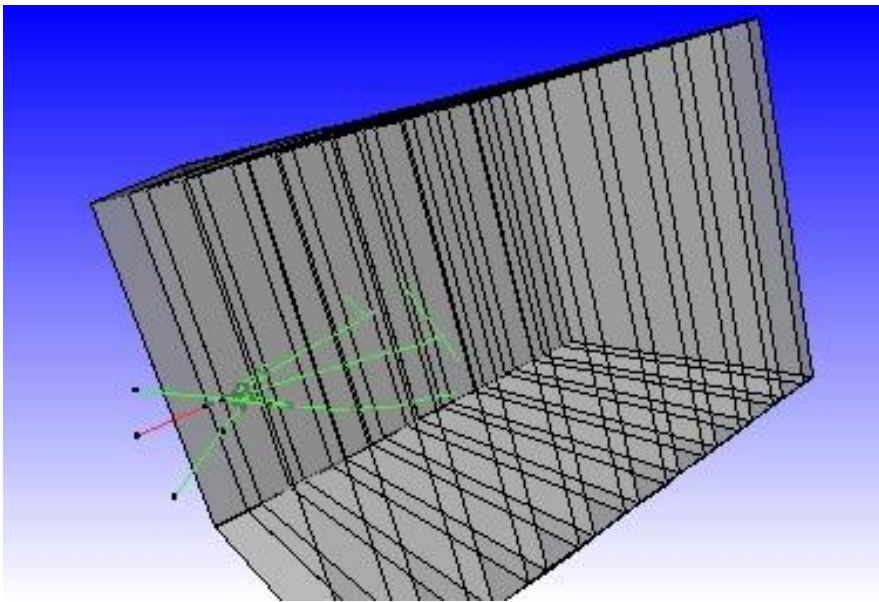
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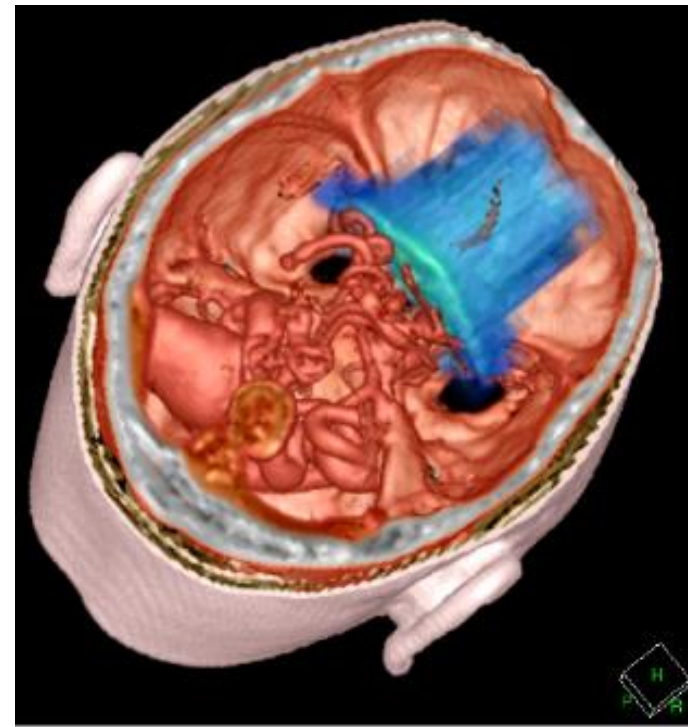
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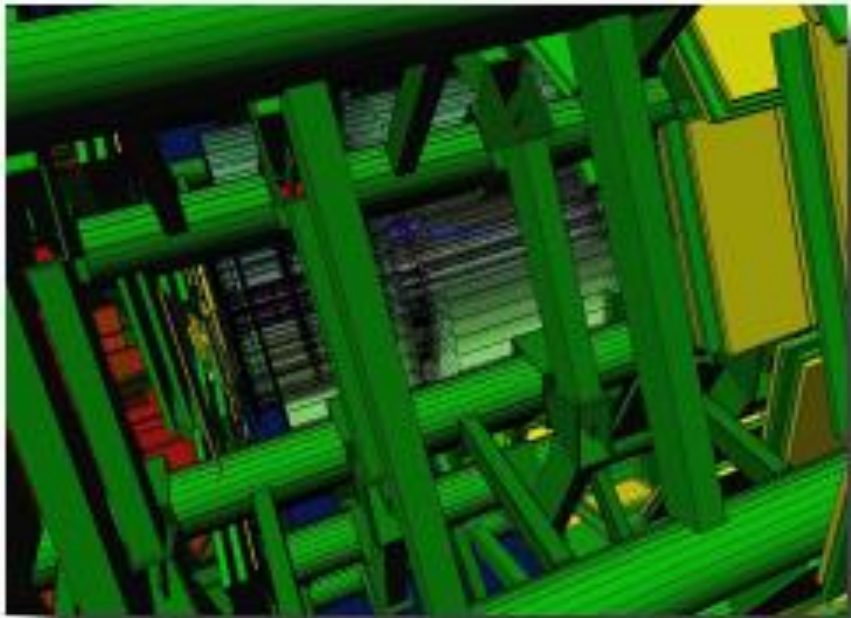
DAWN

# Thoughts on HSF

- I was embarrassed a lot to hear the discussions more on politics than technical things at the first HSF meetings honestly speaking
  - Japanese people often say "too many captains will steer the ship up a mountain"
- I am still confused and trying to find the answers
  - What kind of outcomes are expected from HSF? Why they didn't start from writing requirements for necessary packages commonly?  Why the community doesn't drive the technical specification decisions?
  - Costs including human resource estimations?
  - How to chose the technical leader or the core development team?
    - Having competitions look healthier than bureaucratic decisions
  - For maintenance and support, inter-lab. operations is very helpful
    - Needs more human power  than development itself
    - Costs on user training should be considered also

# An urgent issue in development of simulation

- TeV scale phenomena is reproduced to accumulate interactions in lower energy such as  keV  or below

- The community looks loosing the necessary expertise in such energy
  - Experts knowledgeable to such energy range is retiring
    - Need to hire somebody and train urgently  may be from nuclear engineering or defense
  - Old measurements are often not reliable
    - Needs to take points by hands from plots often
    - Authors retired and no way to know the exact experimental setup sometime
  - Nobody wants to do necessary new measurements in voluntary

- Nobody wants fast but inaccurate simulator

- Inter-lab. wide systematic efforts are necessary

# Toward ILC

- People in the Japanese HEP community believe that they have a big chance to host ILC
- Toward ILC, importantness of computing and software is being recognized by leaders
  - Some of them knew HSF
  - I believe that Japanese commitments on development of software and new distributed computing infrastructure are also mandates
  - Discussion on HSF in ICFA will help to convince them
  - This will be a chance to have a professional HEP software development team in Japan

# Personal conclusions

- Developers need the appreciation from users and incentives to continue the development and maintenance of the software through their lifetime
    - Checking the increment of the citation count for our paper is my fun: 6104 @SCOPUS today
    - Geant4 that is the first software in HEP became an inter-discipline standard
    - The Geant4-Japan group will continue the efforts as far as we have users depending on us even in the different disciplines than HEP, but funding matters the future activities
    - Users will decide the fate of the software
- KEK and Japanese HEP community have interests on HSF
- ICFA recognition of HSF will help to encourage Japanese commitments

# CHEP 2015@Okinawa, Japan

- Notifications of paper acceptance is being sent out
  - Because of considerable number of submissions, it will take a time until all of the notifications have sent out

- Please register yourself now if you have not done yet!

- Visit http://chep2015.kek.jp

- The next HEP Software Foundation meeting will be held on April 17th afternoon as a BoF (Birds-of-a-feather) session during the CHEP2015.

- It will be very nice if we see the beautiful sunrise of HSF at the really beautiful tropic island, won't it?
  - I am sorry to inform you that OIST is in the sun-set side for the island, anyway