

SCOAP³ and HEP in Japan

M. Nozaki

(高エネルギー加速器研究機構)

Ko-Ene-Ken, KEK

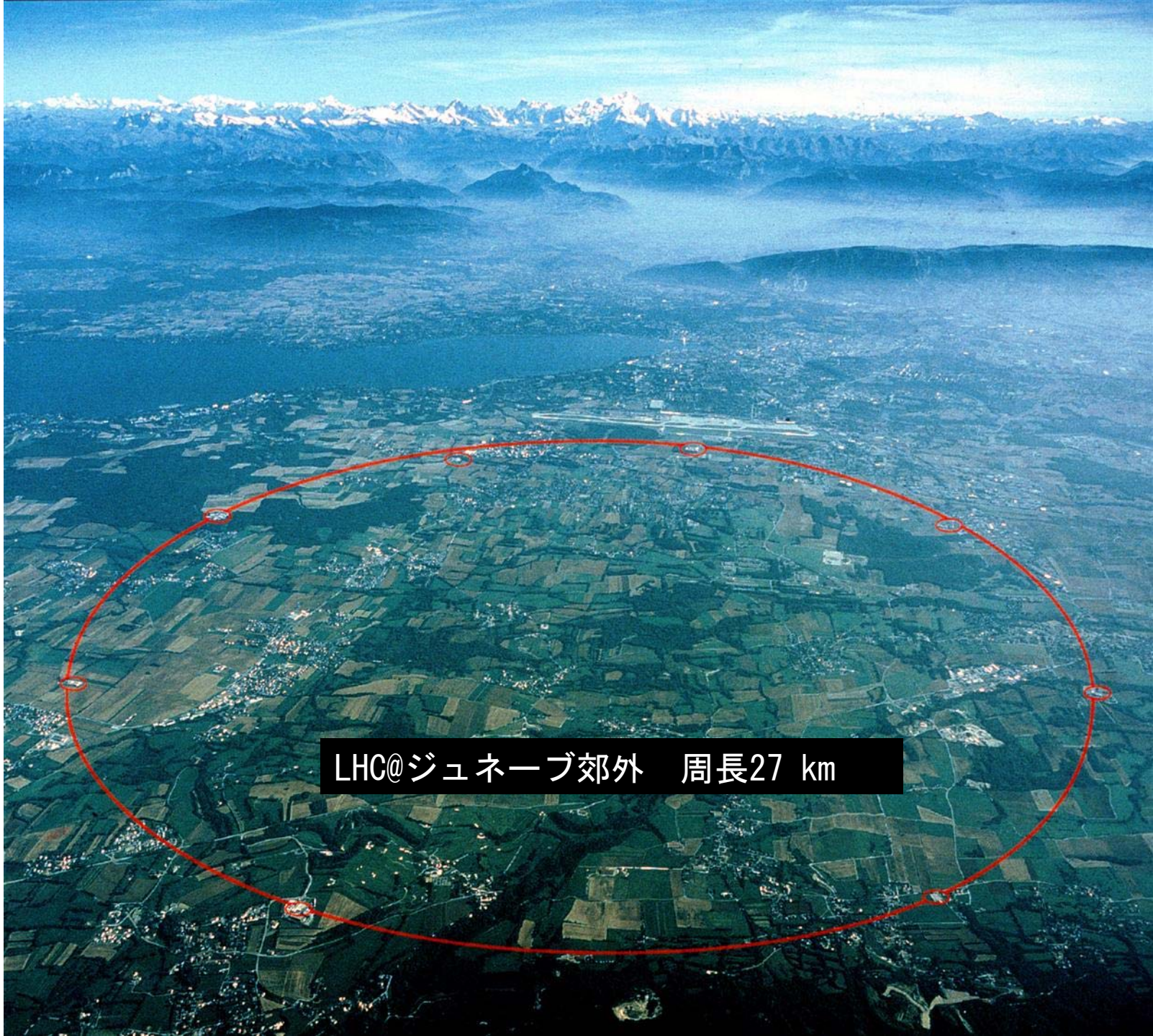
高エネルギー物理学とは？

- 高エネルギー=大きな運動量（相対性理論）
- → 短い波長の波（量子力学）
- → 小さなものを「見る」（光学）
 - 「プラチナバンドはつながりやすい」と同じ理屈

- → 根源的な問題に答える
 - 自然界の最も基本的な法則は何か？
 - 我々は何から作られているのか？
 - 宇宙はどのようにして始まったか？
 - 宇宙はどのように進化するのか？

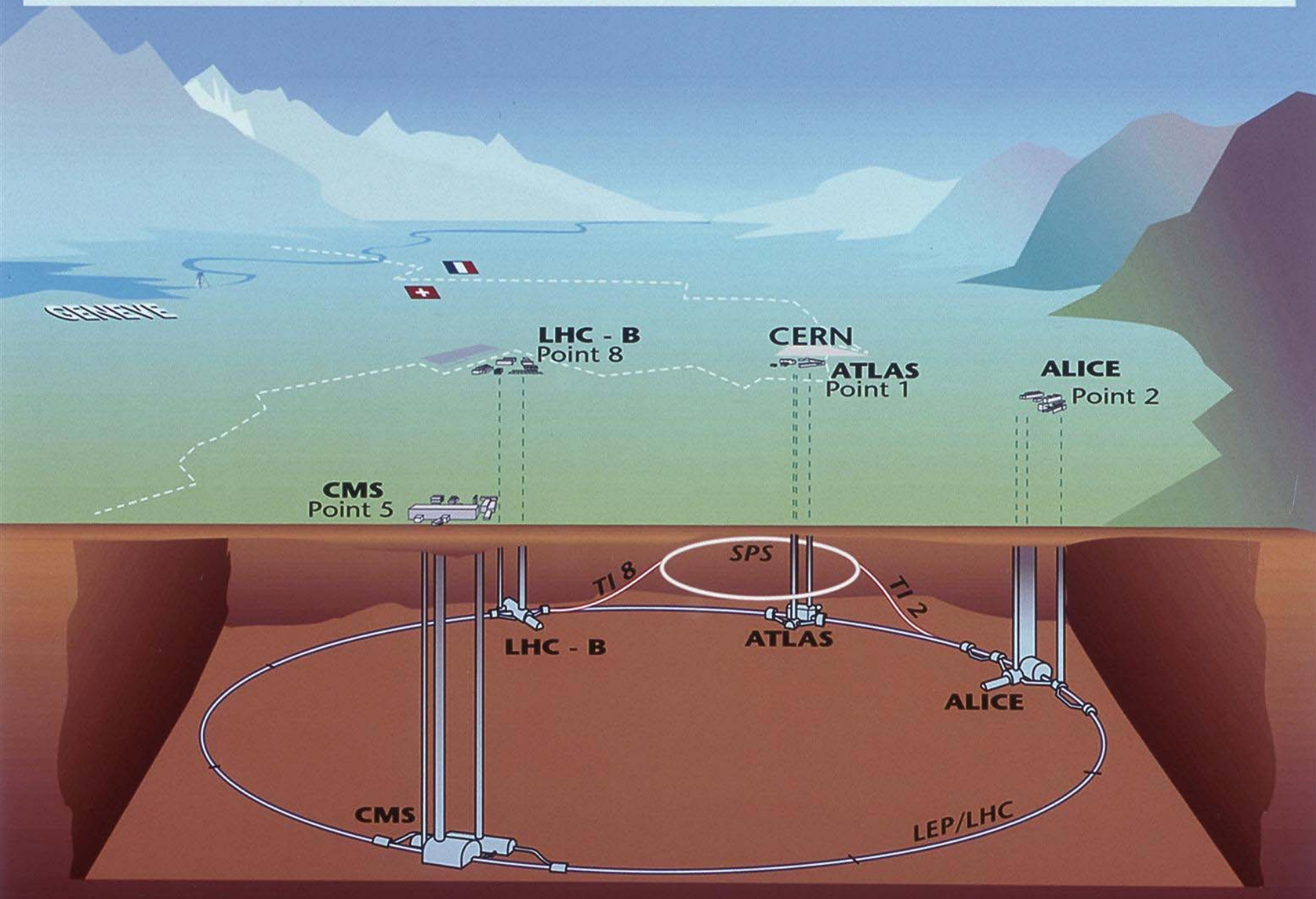
高エネルギー実験とは?

- 粒子を高エネルギーまで加速する
 - 電氣的な力で引っ張る
 - プラスとマイナスが引き合う力を応用する
 - 実際には電波を利用, ドッグレース
- 円形加速器は大きな半径が必要
 - 高いエネルギーになると曲がりにくくなる
- 「コライダー」は正面衝突型の加速器
 - LHC: Large Hadron Collider
 - ILC: International Linear Collider
 - 正面衝突で効率よく粒子を「破壊する」
- 「破片」を巨大「デジカメ」で観測

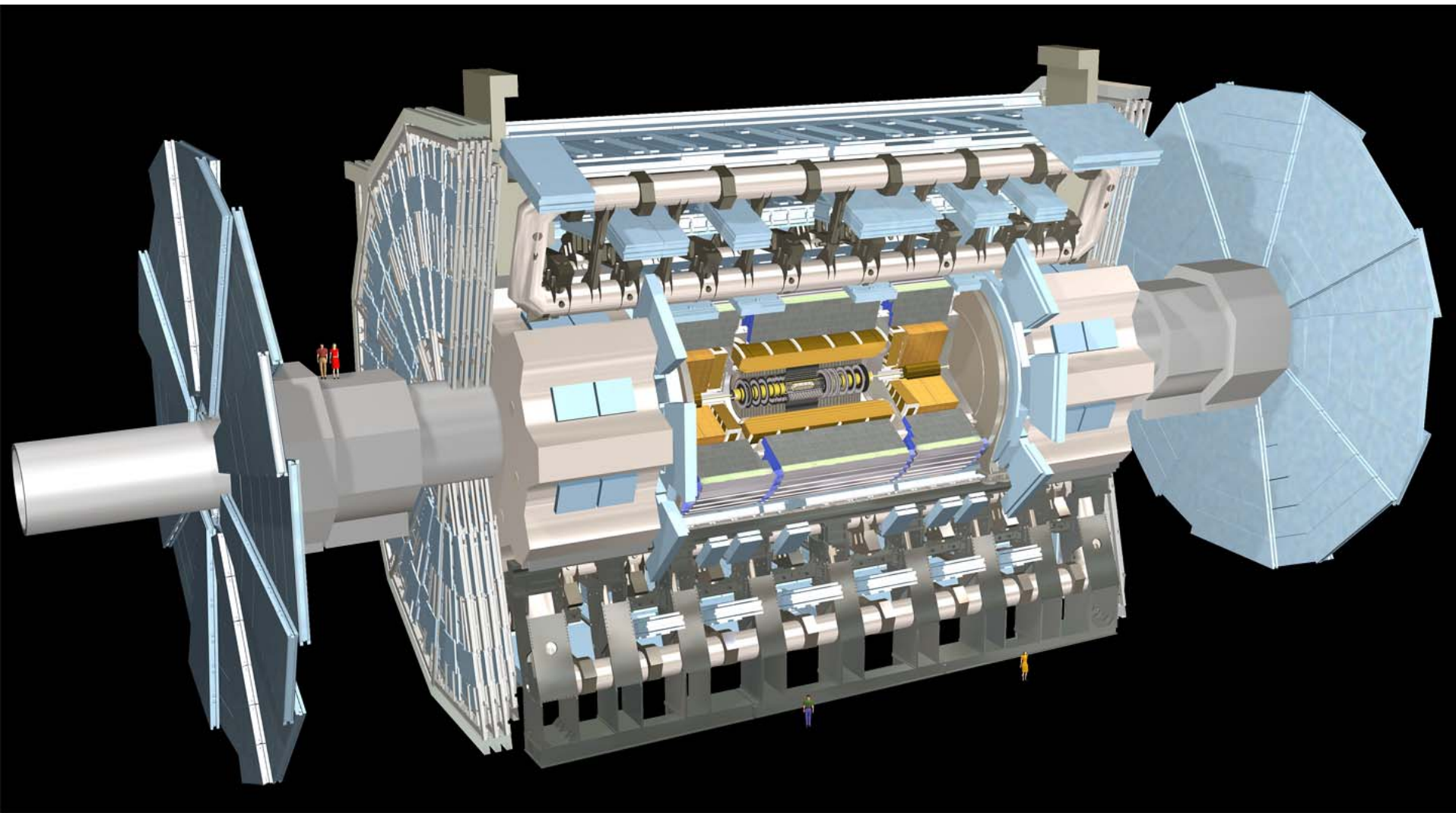


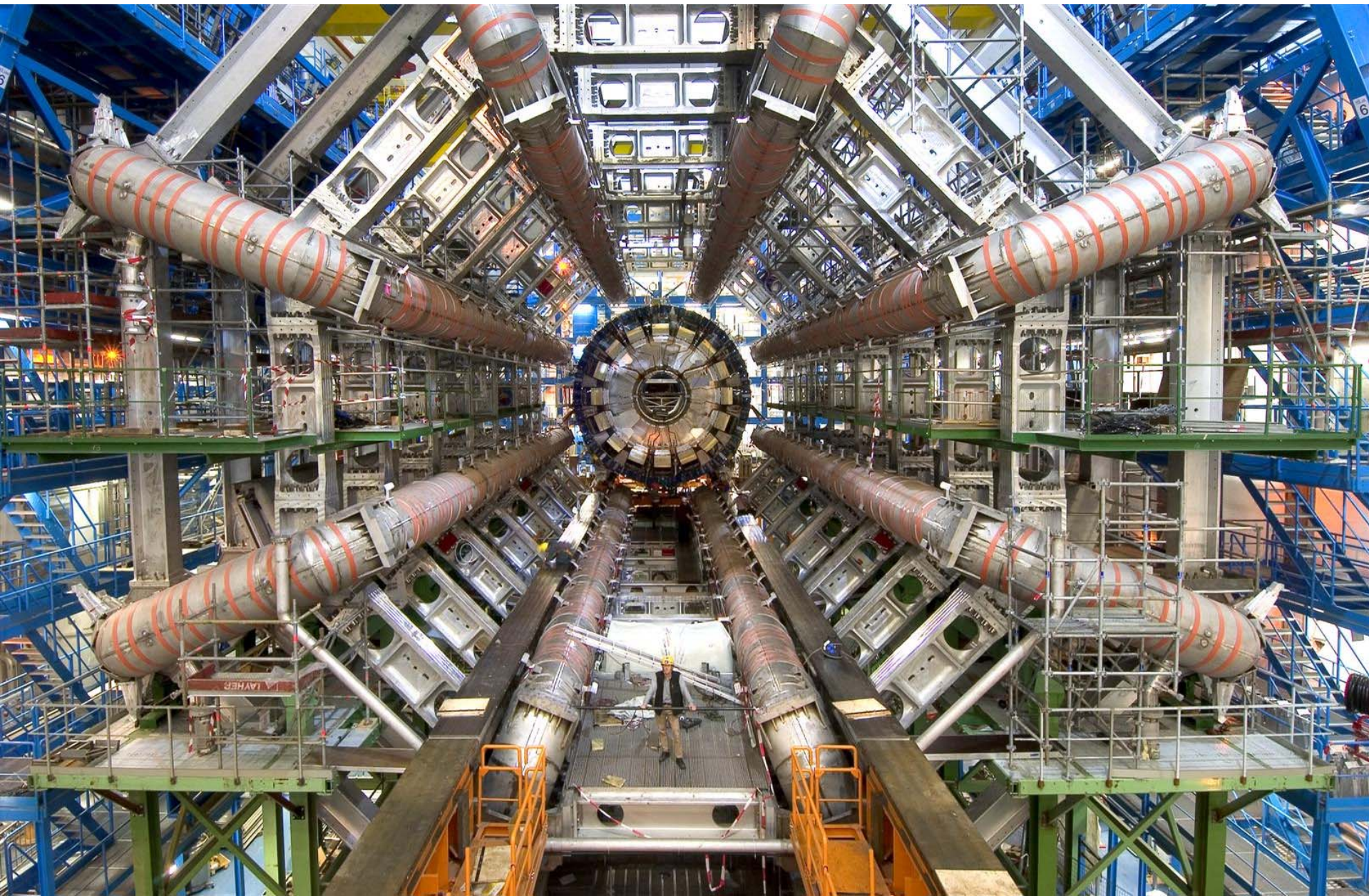
LHC@ジュネーブ郊外 周長27 km

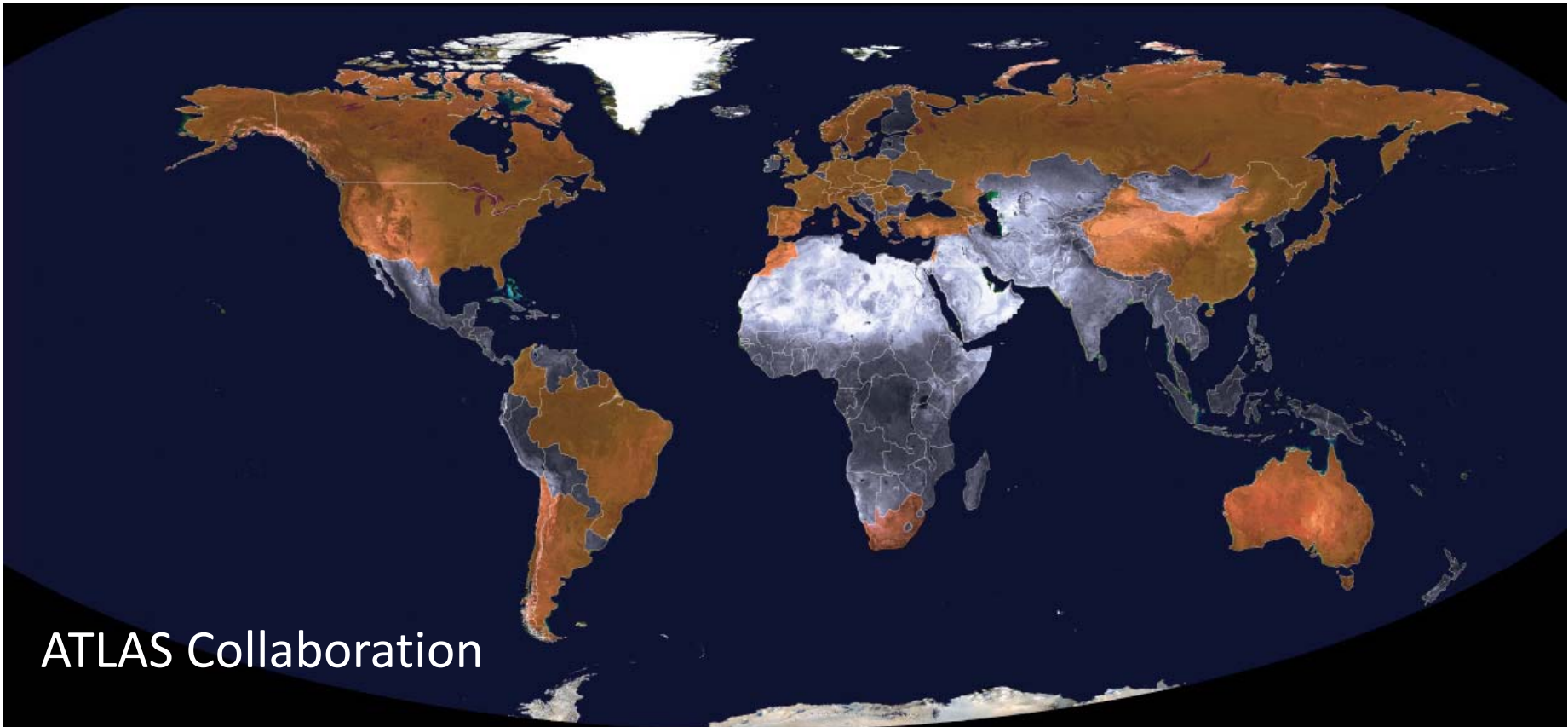
Overall view of the LHC experiments.



ATLAS測定器







ATLAS Collaboration

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Azerbaijan
Belarus
Brazil
Canada

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China
Columbia
Czech Republic
Denmark
France
Georgia
Germany

Greece
Israel
Italy
Japan
Morocco
Netherlands
Norway
Poland

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Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC [☆]

ATLAS Collaboration [☆]

This paper is dedicated to the memory of our ATLAS colleagues who did not live to see the full impact and significance of their contributions to the experiment.

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ABSTRACT

A search for the Standard Model Higgs boson in proton–proton collisions with the ATLAS detector at the LHC is presented. The datasets used correspond to integrated luminosities of approximately 4.8 fb^{-1} collected at $\sqrt{s} = 7 \text{ TeV}$ in 2011 and 5.8 fb^{-1} at $\sqrt{s} = 8 \text{ TeV}$ in 2012. Individual searches in the channels $H \rightarrow ZZ^{(*)} \rightarrow 4\ell$, $H \rightarrow \gamma\gamma$ and $H \rightarrow WW^{(*)} \rightarrow e\nu\mu\nu$ in the 8 TeV data are combined with previously published results of searches for $H \rightarrow ZZ^{(*)}$, $WW^{(*)}$, $b\bar{b}$ and $\tau^+\tau^-$ in the 7 TeV data and results from improved analyses of the $H \rightarrow ZZ^{(*)} \rightarrow 4\ell$ and $H \rightarrow \gamma\gamma$ channels in the 7 TeV data. Clear evidence for the production of a neutral boson with a measured mass of $126.0 \pm 0.4 \text{ (stat)} \pm 0.4 \text{ (sys)} \text{ GeV}$ is presented. This observation, which has a significance of 5.9 standard deviations, corresponding to a background fluctuation probability of 1.7×10^{-9} , is compatible with the production and decay of the Standard Model Higgs boson.

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日本のHEP論文をめぐる状況

- Progress of Theoretical Physics (PTP)
 - 1946年創刊, 湯川秀樹の尽力
 - 一般的には理論物理学の論文誌と認識されている
- 高エネルギー実験のほとんどは海外の論文誌に投稿
 - 評価の高い海外の雑誌で認められたいという研究者の希望
 - 共同研究者の了解が国内誌では取りにくい
 - 国際共同研究が常態化しているため, 外国での購読数も弱点
 - Journal of the Physical Society of Japan (JPSJ)
- 国内誌への投稿促進の試みはあったが流れは変わらなかった
 - 雑誌名から「理論」と「日本」が消え, OA化されることが最低条件
- arXiv の利用が日常的で, 多くの研究者は学術誌に無関心
 - 97% は, 投稿と (ほぼ) 同時に arXiv に掲載



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日本のHEP論文をめぐる最近の大きな変革

- PTP と JPSJ 統合

- Progress of Theoretical Physics (PTP) : 理論物理学刊行会
- Journal of the Physical Society of Japan (JPSJ) : 日本物理学会/刊行センター
- 発行業務を日本物理学会/刊行センターに集約し、経営の効率化を図る

- 日本発の素核宇実験分野の成果

- ニュートリノやBファクトリー等、高エネルギー分野で世界が注目する日本発の実験成果が出始めた。
- HEP実験論文を日本から発信

- 日本のHEPコミュニティへSCOAP3へのお誘い

- 当初、国内誌の参加は将来の課題で、当面は参加しない（できない）と考えていた。
- KEKは国内誌の強化を支援することを優先
 - 実験コミュニティが論文を国内雑誌に投稿するよう働きかけ
 - SCOAP3開始時期が不透明であったため、SCOAP3に依存しない計画を策定した

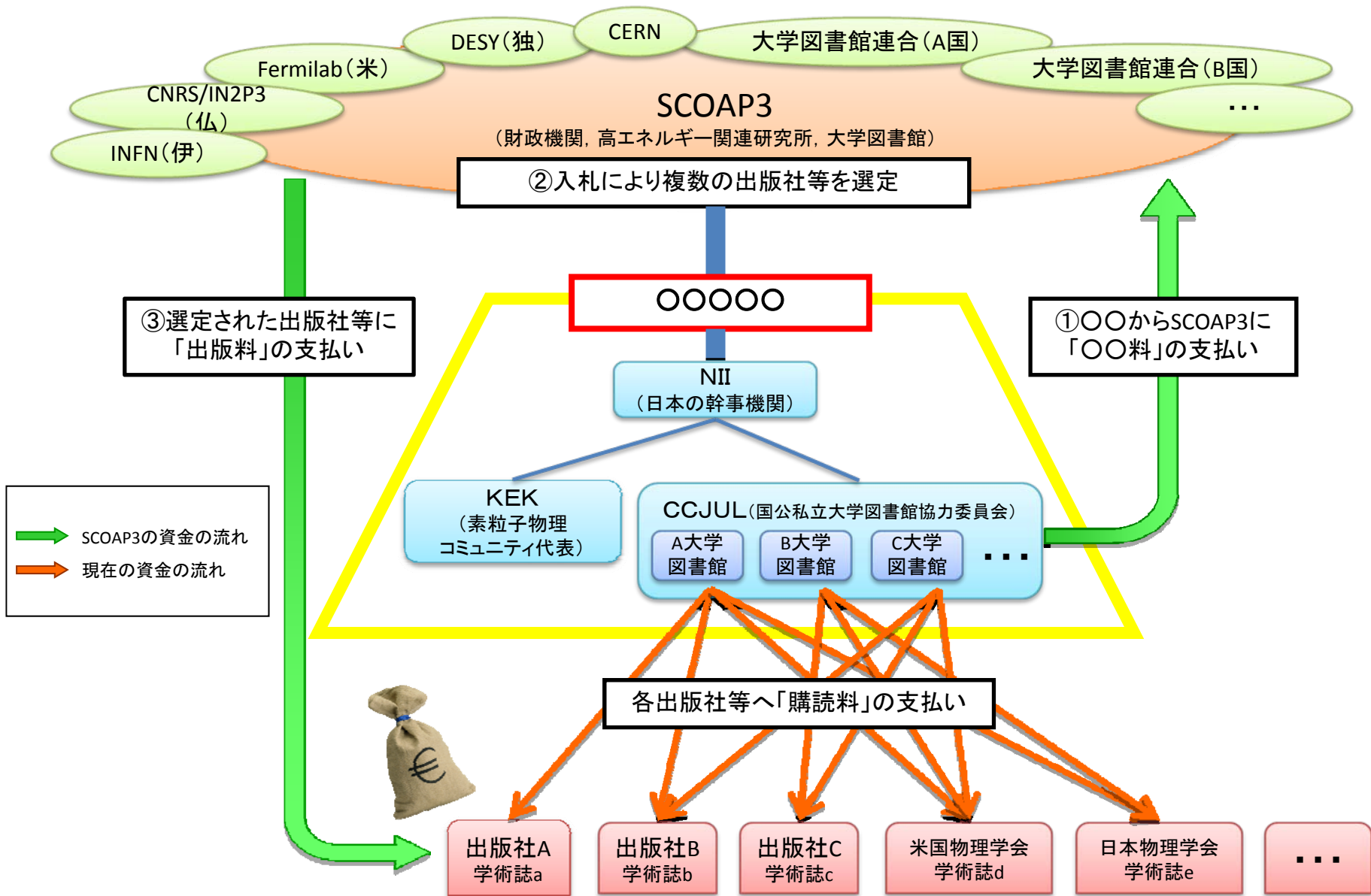
- 結果 : 2013年PTEP創刊

- 2014年開始予定のSCOAP3への参加

PTEP創刊

- SCOAP3への参加を前提とせず，独自にOA化を図る
 - 日本からの情報発信力の強化
- APCモデルを採用
- 従来の PTP への投稿者に加えて，如何に実験論文を呼び込むか？
- 大多数を占める理論論文の投稿者を如何に支援するか？
- 研究機関による支援
 - 共同研究の中核機関によるサポート：KEK，理研
 - 5年程度を目処にサポート機関を順次拡大の予定
- 実現可能性を高める要因
 - コミュニティが比較的まとまっている
 - 共通の研究目的を目指しているという一体感
 - KEK，理研等の共同利用・供用を謳う中核研究機関が存在

SCOAP3の仕組み(イメージ図)



SCOAP3

- OA
 - 理念：公的資金で行われた研究は万人に公開されるべし
 - 実質：「自分の研究成果が掲載されている雑誌を購読できない」を解消
- 経費削減（価格上昇の抑制）
 - 図書館コンソーシアムではなく研究者コンソーシアムが価格交渉
 - APCを胴元が一括して入札（～10MEuro）
 - 原資は図書館の購読料：リダイレクション
- HEPの特徴
 - 主要な雑誌の数が限られている
 - 査読付き7500論文のうち、今年SCOAP3に選ばれた12誌に75%
 - CERNという国際機関が欧州の中核となり、世界的にも大きな影響力をもつ
 - 世界中の研究者がCERNに集結してLHC加速器を使った実験に参加→Higgs粒子の発見

まとめと今後の課題

- 国内誌の統合，OA化，実験論文の投稿促進，SCOAP3への参加が同時並行で進行している。
- 日本のHEPコミュニティとしては，良い論文を如何にPTEPに投稿してもらうか，が最大の課題
- 各国の代表機関としては，異なるコンセプトに基づく収支を如何に整合させるか？
 - SCOAP3への「拠出金」は掲載論文数がベース
 - 原資は図書館購読料のリダイレクション
 - “大学” 図書館以外の購読調査（共同利用機関，独法，その他の研究所）
- SCOAP3としては，10MEuroを集めることが出来るか？
 - WG/TFによる作業が始まっている