Interim report from Cosmic Ray Committee (CRC) for Japanese strategy on astro-particle physics

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ICRR External Review

The CRC (Cosmic Ray Researchers Congress)

- Japanese cosmic ray researchers have organized their own community council since 1950’s.
- Totally voluntary basis
- Bottom up ideas and opinions, react as a liaison of the community
- Promoted when establishment of ICRR. Still partially commit for management of ICRR (Kyodo-Riyou)
- Discuss future direction, but no function for funding
- CRC executive committee is elected by the community

Road map of future CRC science

- CRC called future projects and organized a special “future plan” workshop (Aug2010)
- Proceedings of the workshop has been edited

CRC シンポジウム総括：

宇宙線分野の現状と将来計画

平成 22 年度宇宙線研究者会議実行委員会

将来計画冊子編集ワーキンググループ

平成２３年６月３０日

広汎な宇宙線物理学の研究対象と周辺分野

GUNDAM

SMILE

30cm ETCC in operation

CALET

Tibet AS+MD+YAC

JEM-EUSO

Solar-Terrestrial Environment

NEWAGE

TA-phase2

XMASS

TALE

DECIGO

CTA

LCGT

GADZOOKS!

Hyper-Kamiokande

KamLAND-Zen
KamLAND2-Zen
SuperKamLAND-Zen

IceCube/ARA

LHCf

天体物理

銀河系外天体

銀河系内天体

高エネルギー天体
（超新星、ブラックホール、ガンマ線バーストなど）

太陽

銀河団、宇宙の大規模構造

ダークマター

宇宙物理

宇宙線物理学

地球物理

X線、γ線

宇宙初期

重力波

高エネルギー粒子

地球

宇宙線と大気の相互作用

ニュートリノ

素粒子物理

新粒子の発見の歴史
（反粒子、中間子、sクォークなど）

宇宙線生成核種

地球の放射線

Science *Council* of Japan (Nihon Gakujutsu Kaigi)

- Official organization of scientists connected to government .
- Two sub-division committees for fundamental science – astronomy and nuclear/particle physics.
- There is no division for cosmic rays physics, which belongs to both.
- Science Council of Japan has nominated a list of "Master Plan" for big science (>100M$) .

  Concerning cosmic rays there are;
  - Megaton neutrino detectors with LBLE (i.e. J-Parc + Hyper-K) for nuc/part sub-commitee
  - Gravitational wave observatory (i.e. LCGT) for astro. sub committee.
- This scheme is now the only way to realize such big budget.
  - LCGT has now successfully been funded.

Call for medium size projects by SCJ astronomy sub-committee

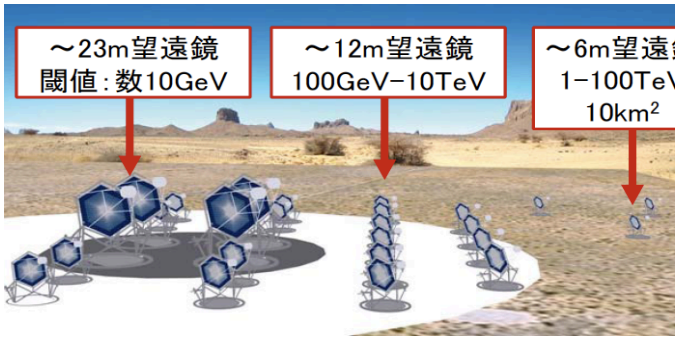
- Voluntary astronomy sub-committee of Scientist Council of Japan called for “middle size” projects.
- CRC formed sub-committee for “future project” including non-CRC members.
- CRC nominated 8 “medium-size” projects from 3 fields, reviewed by Astronomy sub-SCJ (Oct 2011)
- However main board of SCJ renewed their strategy for “Master Plan” in this Sep. Now “big” and “medium” size plans all mix up.
- This does not mean actual funding, but it may benefit for future funding plans by MEXT.

CRC town meetings / SCJ future project symposium

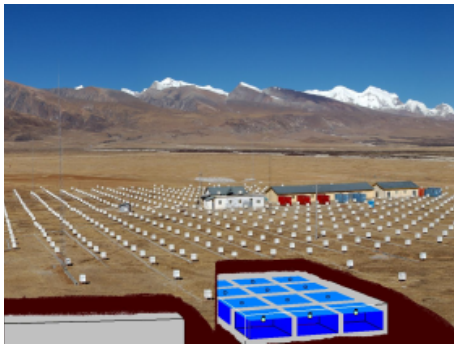
1	Jul 30, 2011	8 medium size projects (all 3 categories)		
	Oct30, 2011	Submit to astro sub-comm.		
2	Jan 22, 2012	γ-astronomy		
3	Jun 30, 2012	Highest energy CR		
4	Jul 22, 2012	Underground (neutrino and DM, $\beta\beta$) + Hyper-Kamiokande		
5	Nov 24-25, 2012	All 3 categories (5 medium size)		
	Nov 30, 2012	Submit to astro-sub comm.		
	Feb 8, 2013	SCJ future project sympo (nucl/ particle)		
	Feb 17-18, 2013	SCJ future project sympo (astro)		

8-medium size projects

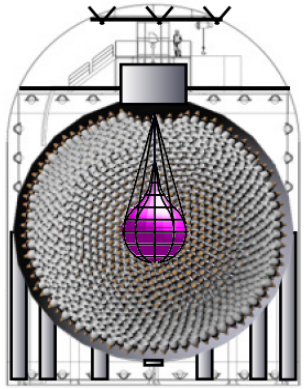
γ-astronomy



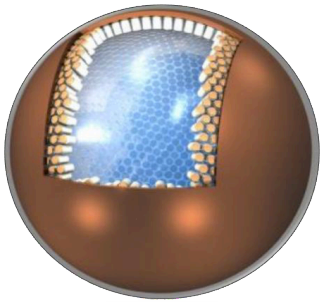
CTA



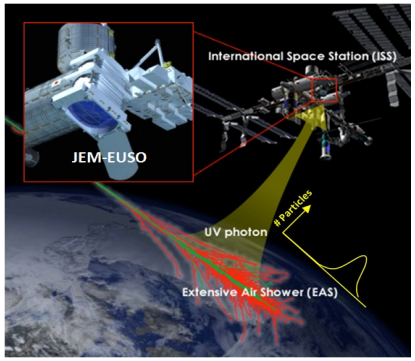
Tibet ASγ



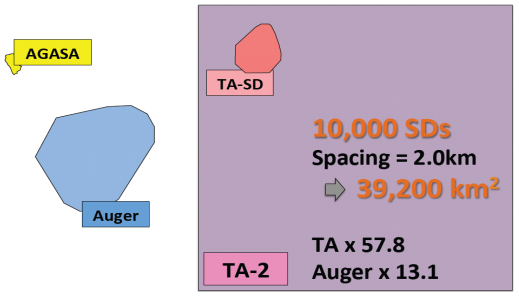
KamLAND2-Zen



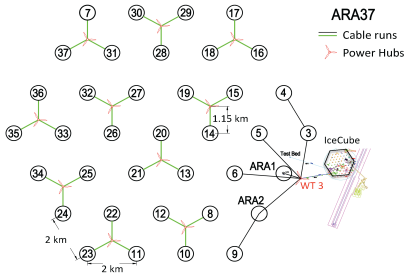
XMASS-1.5



JEM-EUSO



TA2



IceCube/ARA

Gadzooks!

Underground

Highest energy CR

Submit 5 medium size projects

Project	Cost	Science	Urgent	Visibility	comments
Endorse with the highest priority					
CTA (2017–)	$200M (Japan $40M)	S	S	S	サイエンスの評価の高い国際実験であり、日本の貢献も十分期待できる。日本の研究者が中心的かつ継続的に活躍できるよう、強い支援と組織・体制作りが望まれている。
KamLAND2-Zen (2015–)	$30M	S	S	S	独創的であり、宇宙線だけでなく素粒子物理や地球物理にまでわたる多くのサイエンスが期待できる。堅実な計画でもあり、コミュニティも高く評価している。二重ベータ崩壊探索は競合する実験もあり、着実な推進が望まれる。
Endorse with the long-term vision					
XMASS 1.5 (2016–)	$13M	S	S	S	ダークマター検出は成功すれインパクトを与える重要な課題である。現状のバックグラウンド対策の正否が次に進む重要な判断材料。競合する海外の実験があり、すみやかな進展が望まれる。
JEM-EUSO (2017–)	$180M (Japan $60M)	A	S	S	衛星から空気シャワーをみるという新しい試みだけに、技術が確立されるかどうかが、計画開始の大きな判断材料となる。進行中、計画中の技術実証実験の結果が期待される。国際実験であるが、現在、主導権を日本がこのまま握れるかどうかという大事な時期であり、支援が望まれる。
TA2 (2020–)	$100M (Japan $30M)	A	A	S	最高エネルギー宇宙線が陽子か鉄かで、今後の研究の方向性に大きく影響する。現在のTAや競合実験との検証結果が待たれる。

With the earliest opportunity with grand-aid fund

Project	Cost	Science	Urgent	Visibility	Comments
Gadzooks! (2015-)	$10M	-	-	S	
IceCube/ARA (2017-)	Japan $1.7M	-	-	S	
Tibet AS γ MD+YACII (2014-)	Japan $9M	-	-	S	

CRC future plan report 2013

- CRC future plan sub-committee will finish in this spring.
- Future plan report will be issued.
- Future plan sub-committee may be renewed and run again after this spring under new CRC exec committee.

Impact of CRC Town meetings to the community

- Activate voluntary-based discussions in CRC community among different projects.
- First excersize for peer review by CRC community itself to determine feasibility, science impact and priority
- Real good feedback to experiments.
  - Attempt for Review paper of the CANGAROO experiment
  - Started actual collaboration btw TA and EUSO.