

Kavli Institute for the Physics and Mathematics of the Universe

Intl Workshop on Condensed Matter Physics & AdS/CFT
May 26, 2015, Kavli IPMU

How did the Universe begin?
What is its fate?
What is it made of?
What are its fundamental laws?
Why do we exist?
We need **astronomers**,
physicists, and **mathematicians**



WPI: major program by MEXT, ~\$13M/year, 5+5 years

Origins of Universe/ Earth/Life



U. Tokyo 2007



Tokyo Tech 2012

Materials/ Energy



Tohoku U. 2007



NIMS 2007



Kyushu U. 2010

Life Science



Osaka U. 2007



Kyoto U. 2007



U. Tsukuba 2012



Nagoya U. 2012

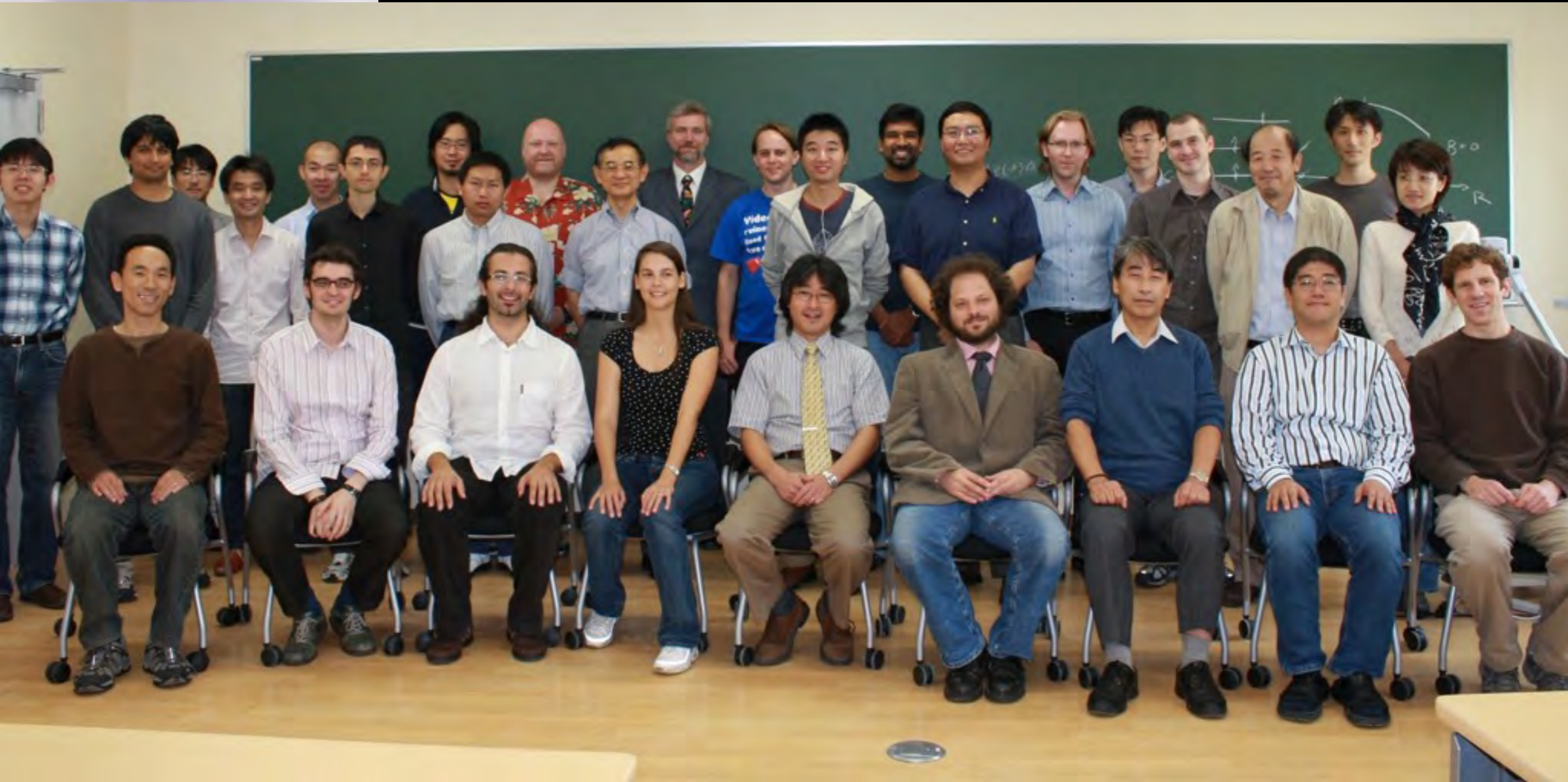
world class, international, interdisciplinary, system reform

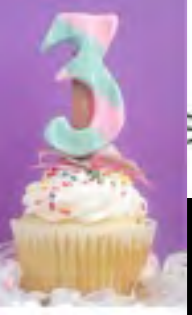


Oct 2007

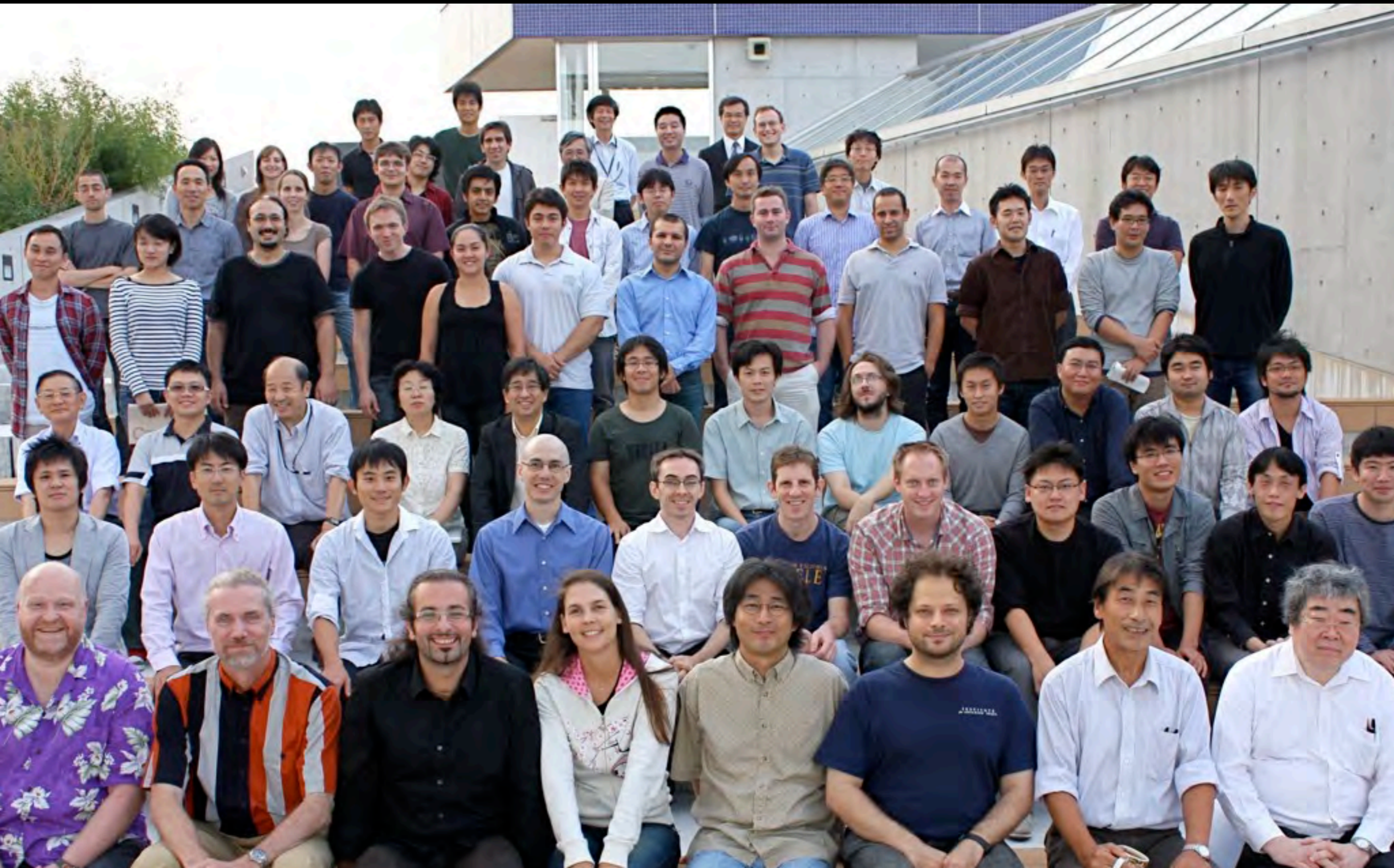


Oct 2008





Oct 2010





Oct 2014



international members 56%

postdoc stats

- >700 applications every year
 - >80% from outside Japan
 - appoint ~15 every year
- hired 107 so far, 63 left by FY'13
 - 28 already landed on faculty jobs (44%)!

Clear leadership roles

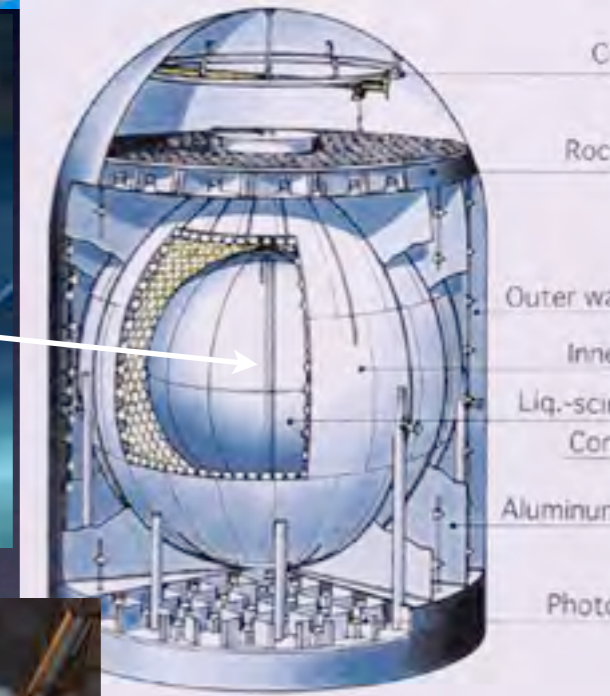
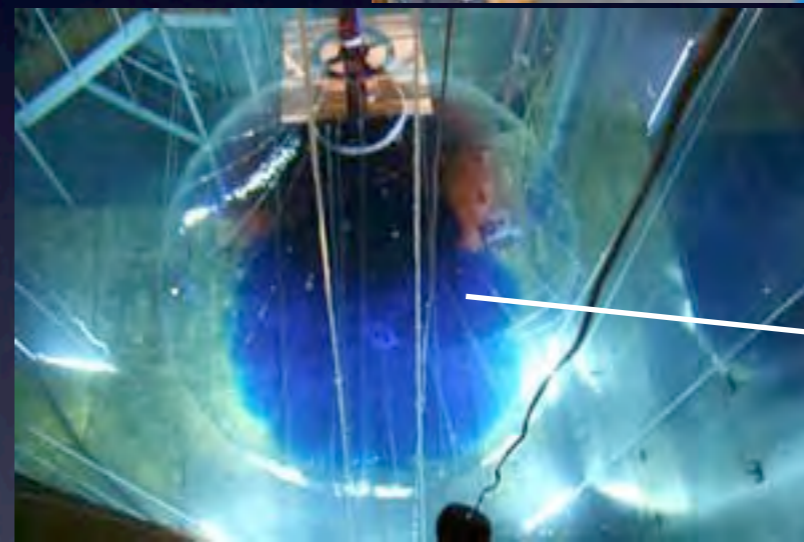
- Vagins pioneered the concept to detect supernova relic neutrinos with Gd in SK



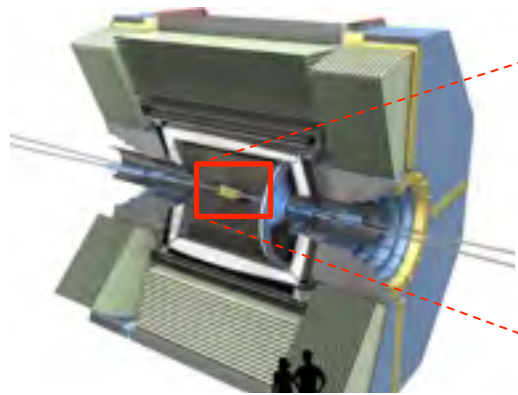
- Kozlov developed the concept to dissolve Xenon gas into KamLAND for $0\nu\beta\beta$



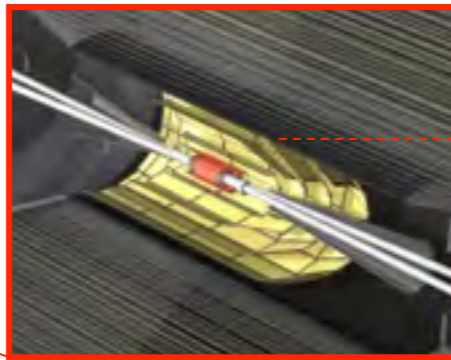
- Suzuki proposed XMASS dark matter expt with single-phase scalable LXe detector



R&D of Belle II Silicon Vertex Detector (SVD)



Belle II Detector



SVD:
4 cylindrical layers



SVD "ladder":
7-16 ladders per layer

Outermost layer of SVD assembly downstairs

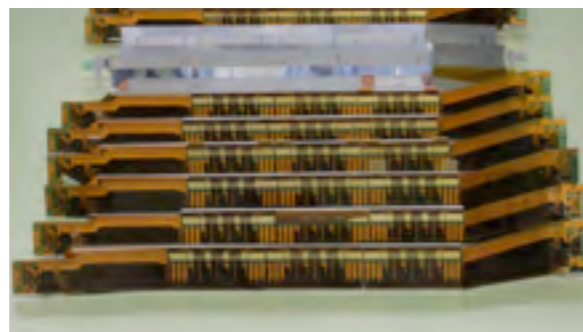
Pickups of Our Achievements

Assembly procedure and tools

- develop the assembly procedure from scratch
- design all assembly jigs

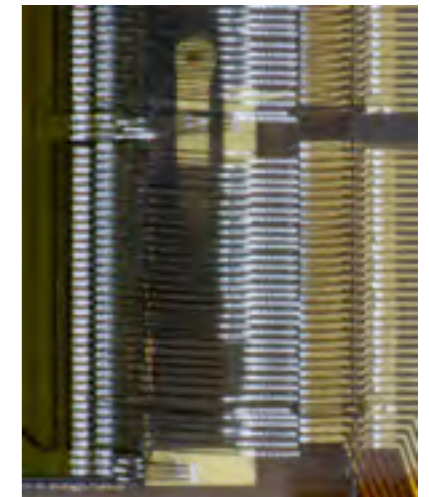


- compatibility fully confirmed by dozen assemblies of a mockup ladder.



Assembly techniques

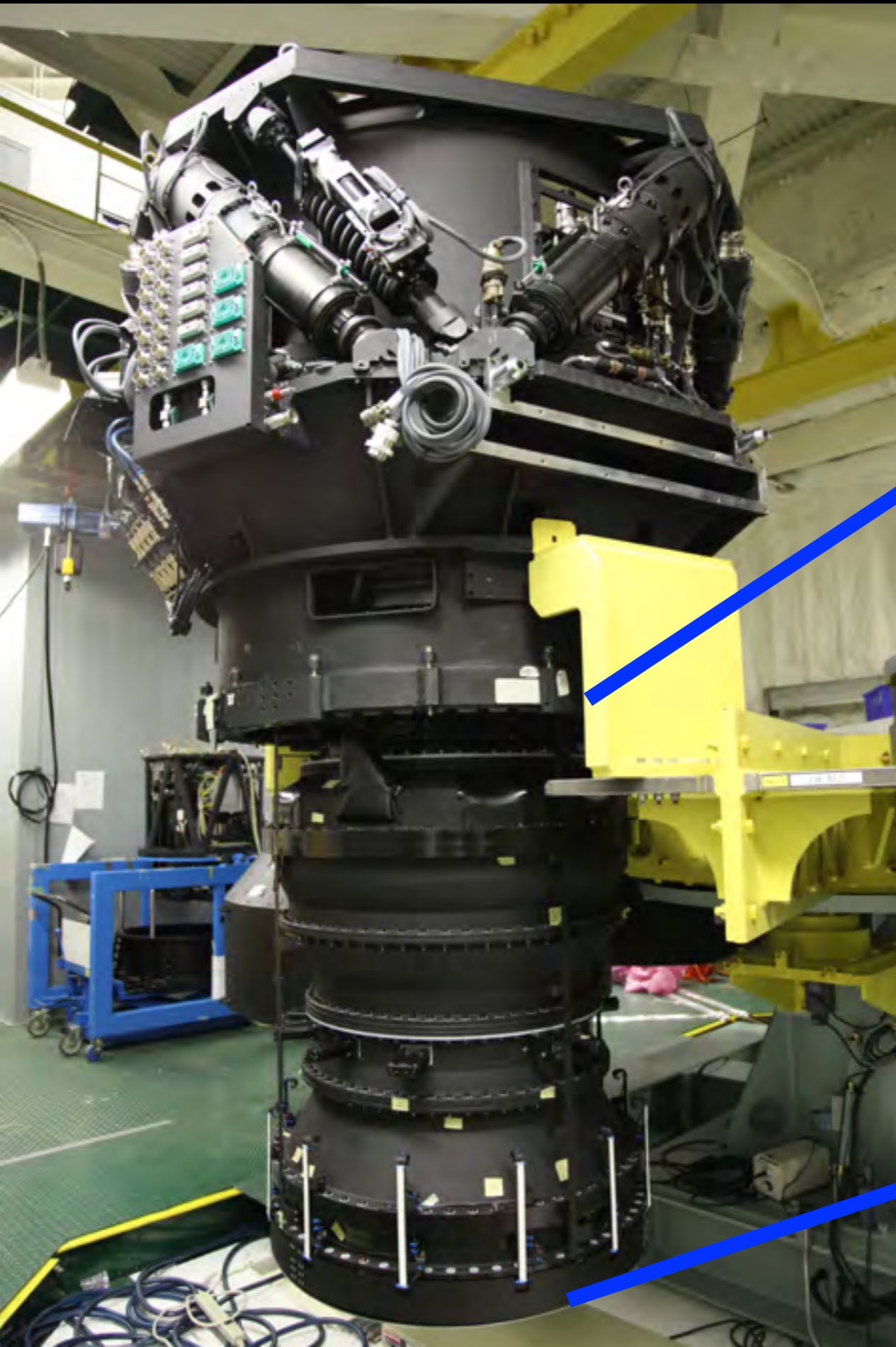
- high bonding efficiency
- high pull strength
- tested on mockup materials:
 $\epsilon_{\text{bond}} \gtrsim 99\%$ and $F_{PS} \gtrsim 7\text{gw}$.
- success to control the epoxy-glue viscosity under the bonding pads, which subsequently provides stable pad base.



The Kavli IPMU is one of the most advanced institutes among the SVD collaborations. We are a *de facto* reference.



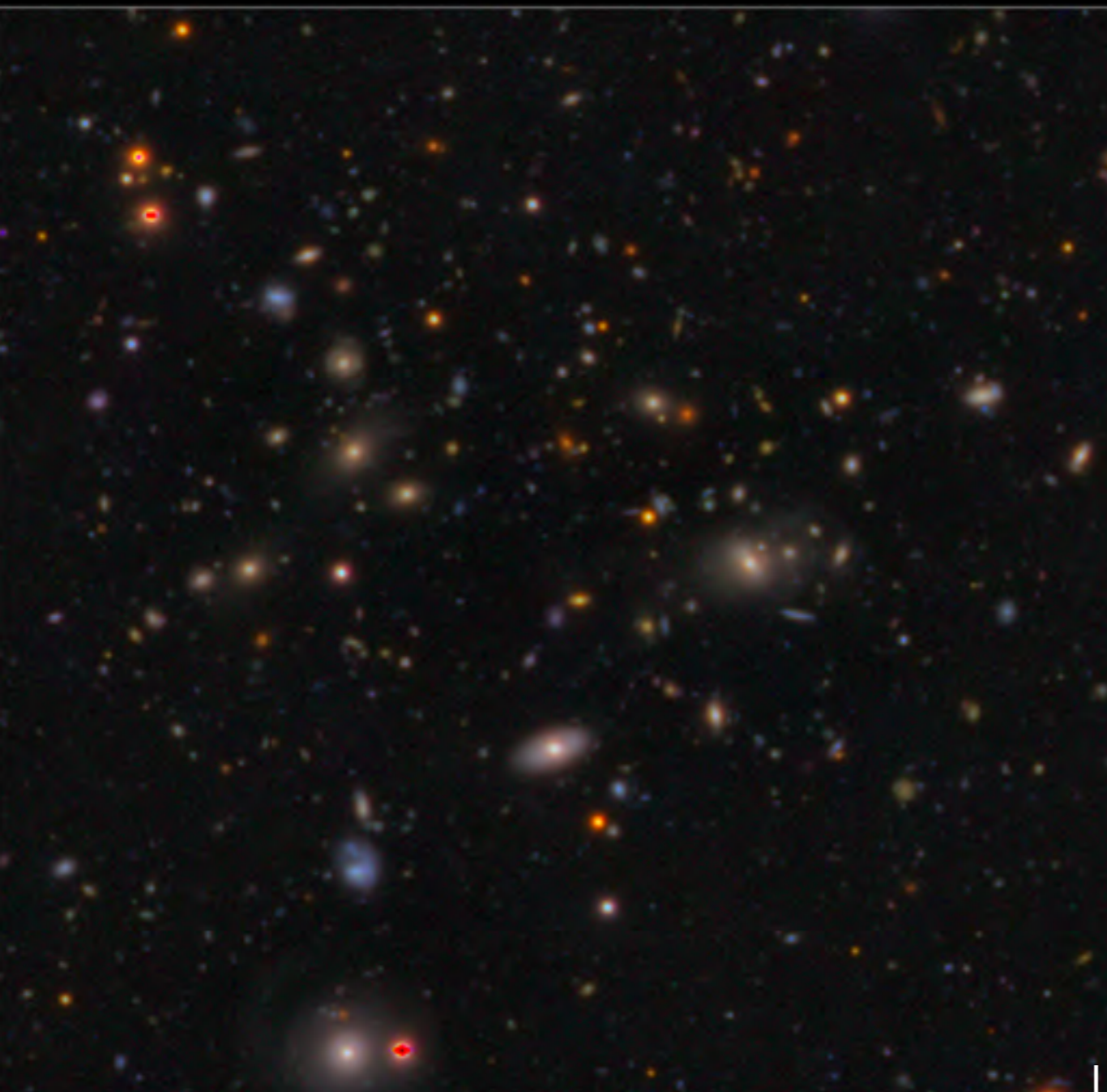
2014/07/29



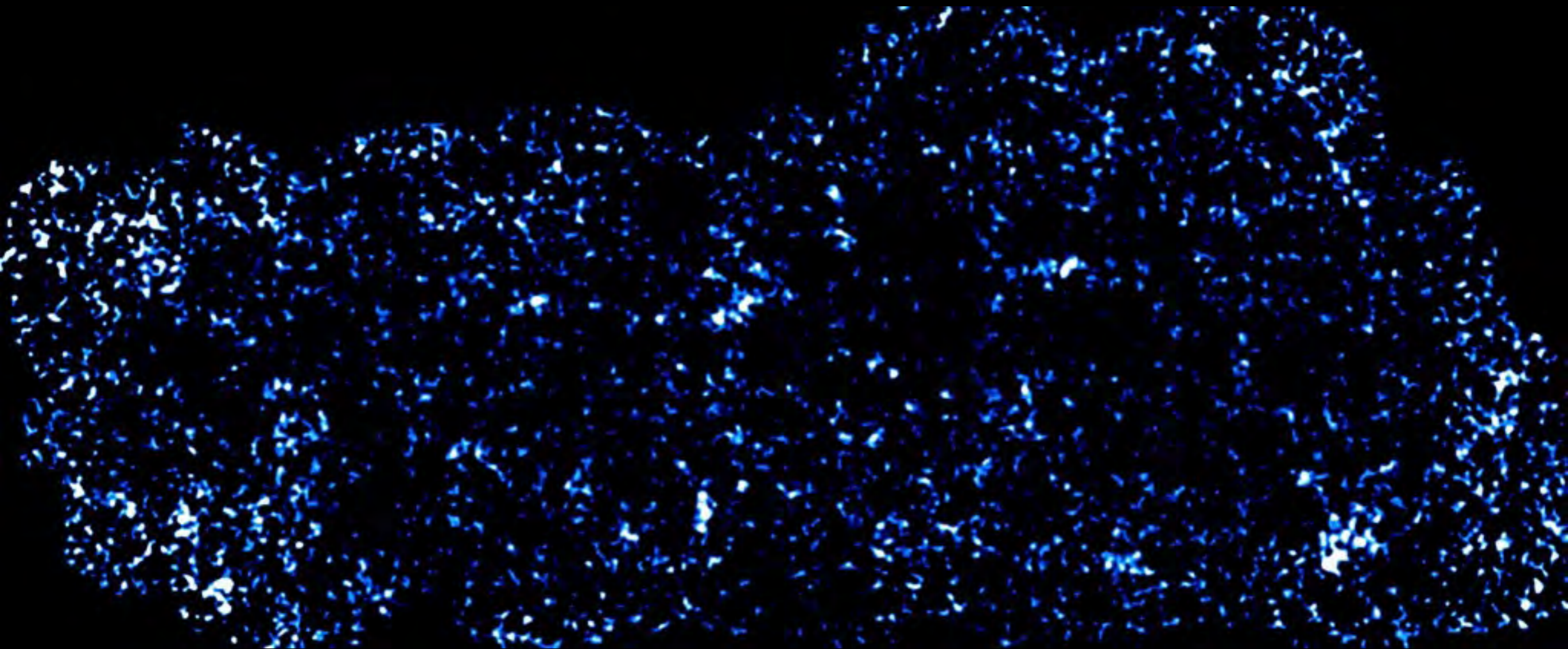
superb performance

HSC: 3 colors in 2.5hours

HST: 1 color in 500 hours

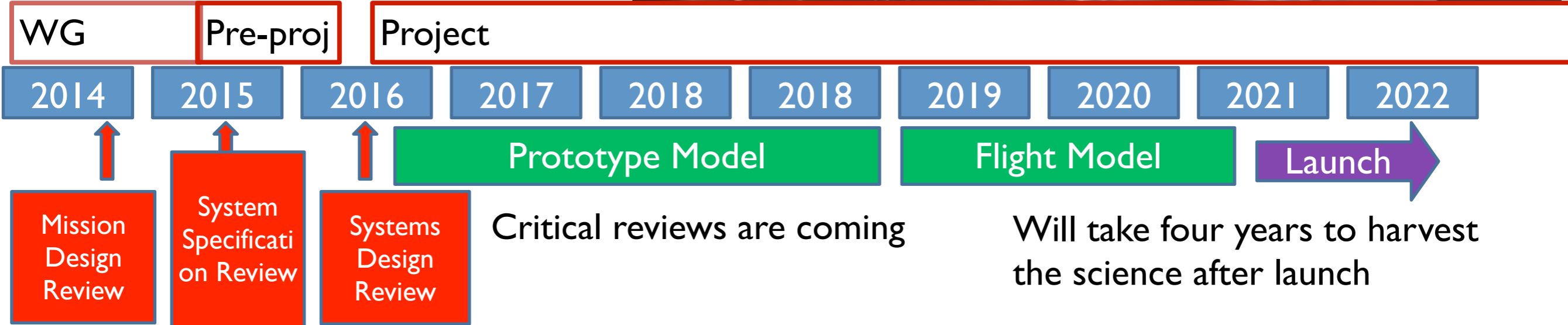
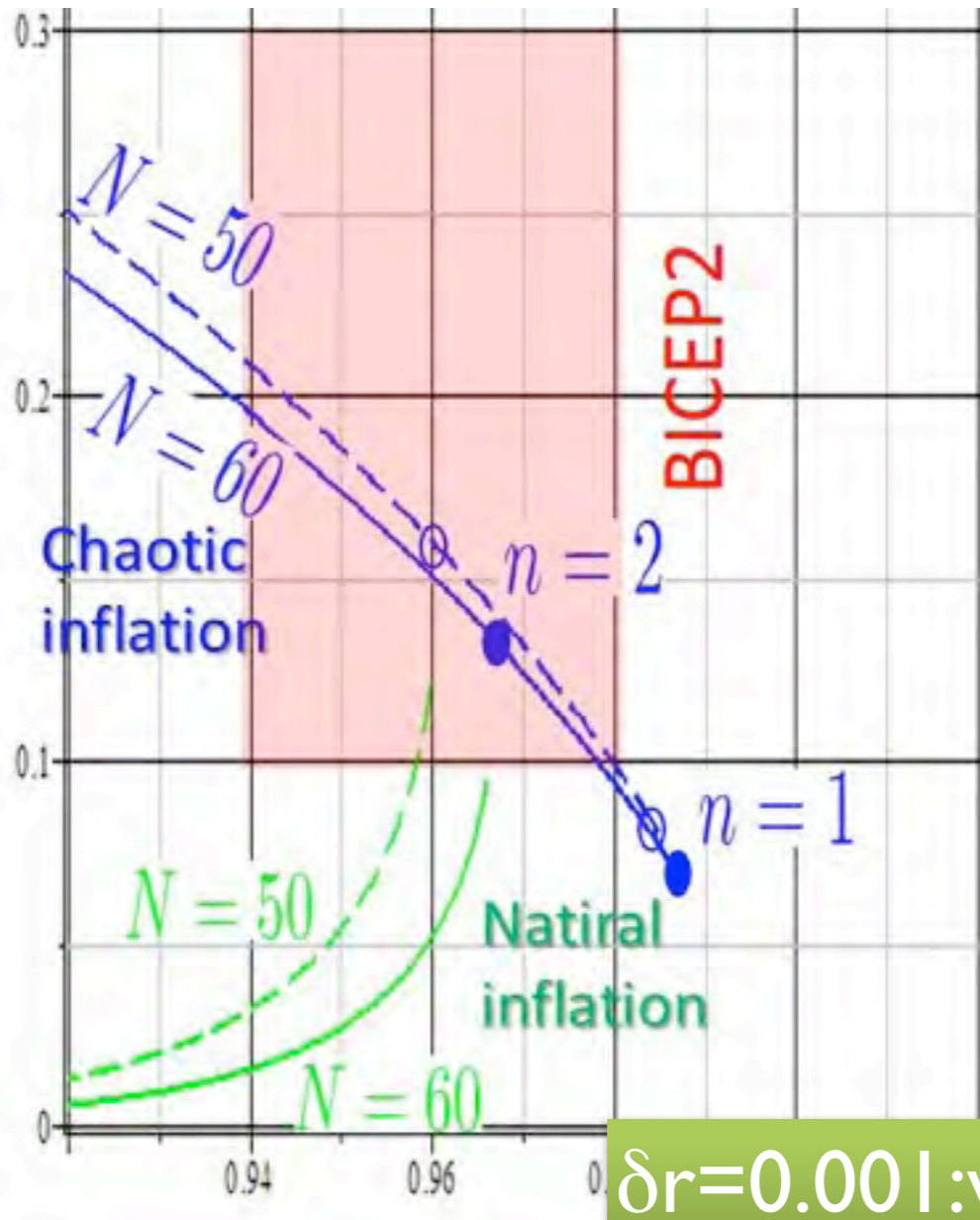


Weak lensing mass map for ~ 20 sq. degrees field (*2hrs data*)



LiteBIRD

A satellite for measurements of the cosmic microwave background polarization to explore the universe before the hot Big Bang



Future?

- Current funding is good till March 2017
- *Will we disappear from the map?*
- WPI funding is for 10 years, and **5-year extension is possible** for institutes “**with outstanding results**”
- The program committee reviewed the initial five institutes last year



**FY 2014 Follow-up of WPI Program
By Program Committee**

February 2015

(This report deals with progress made under the WPI Program in FY 2013.)

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Sustainability of WPI centers

A condition upon the host institutions' acceptance to establish a WPI center was that they would sustain the center with their own and other resources after the WPI grant ended. Furthermore, the presidents of the host institutions have repeatedly declared and confirmed their support for their centers.

Follow up of 5 WPI centers launched in 2007

The WPI Program supports the centers for a period of 10 years. A possible extension for another 5 years is applicable to those with outstanding results. Afterwards, these centers are to be sustained under the auspices of their host institutions.

All five of the WPI centers launched in 2007 applied for a possible 5-year extension after their initial supporting period for 10 years. These centers are AIMR, Kavli IPMU, iCeMS, IFReC and MANA.

The WPI Program Committee examined carefully their achievements and concluded that all 5 centers have achieved a "World Premier Status," fully meeting the goal of the WPI program. After extensive discussion on the definition and implications of "outstanding" as the level of achievement needed to warrant a 5-year extension, the committee members agreed to apply it to only highly exceptional case(s) whose achievements are far beyond the very high WPI standard. As a result, among the five centers under consideration, Kavli IPMU was nominated for a 5-year extension.

Summary



Sep '14 site visit

- Kavli IPMU is *our treasure*
 - Should become a *national treasure*
- Kavli IPMU started from scratch and has already achieved the “**world premier**” status
- Kavli IPMU has become a career path in the world’s **brain circulation**, is highly visible and bears the prestigious Kavli name
- I support the initiative for a **new graduate school**
- UTokyo will permanently support Kavli IPMU
 - We have secured \$7M/yr beyond WPI
 - including 15 tenure pos. April 2015
 - **We commit the rest if given the highest evaluation**

We are here to stay!