Concluding Remark

Eiichiro Komatsu
(Max-Planck-Institut für Astrophysik)
“Cosmic Acceleration” Kick-off Meeting
September 21, 2014

Great start

- ~100 participants in the middle of holidays, in such a short notice

- Remarkable enthusiasm in the community!

Just in case you have not realised already…

- Observational cosmology in Japan is **exploding**
- **This is unprecedented: we have never seen the rapid development of this magnitude before**
  - I left this country, because there was no observational cosmology in Japan back in 1999
- HUGE change now!

Amazing Experiments

- **B01**: CMB [*Simons Array* and *LiteBIRD*]
- **B02**: Imaging LSS [*HSC*]
- **B03**: Spectroscopic LSS [*PFS* (and *eBOSS*)]
- **B04**: Direct measurement of acceleration [*TMT*]
- **All of these are front-runners in the world**
  - *It's like… wow. They are potential game-changers*

Amazing Experiments

- **B0**
- **B0**
- **B0**
- **B0**
- **All**
  - *It's like… wow. They are potential game-changers*

Do participate!

You may contribute to changing the history of cosmology and astrophysics

Do not miss this opportunity!

Apply for positions; apply for grants

Amazing Theory Groups

- **A01**: Inflation
- **A02**: Dark Matter
- **A03**: Dark Energy
- **C01**: Fundamental Physics
- **They have been front-runners already. Just let them do whatever they want**

Amazing Theory

- **A0**
- **A0**
- **A0**
- **C0**
- **Th**
  the

In my humble opinion:

Theorists should do whatever they want, so they do not have to aim at the following specifically, but:

Perhaps one of the useful outcomes from theoretical studies would be to **propose new observables/ measurements**

Amazing Theory

- **A01**: Inflat
- **A02**: Dark
- **A03**: Dark
- **C01**: Fund
- **They have** … **ust let them do whatever they want**

Personally:

Theori … want,

sc … e

Perh … nes

from … e to

measurements

Tell us what to measure!

Too many theorists compute things that we said we would measure

But, in principle **it should be the other way around**

Amazing Theory

Personally:

Tell us what to measure!

One useful question to ask:

Has [your] theoretical study changed the way we take/analyse the data?

- **A01**: Inflat
- **A02**: Dark
- **A03**: Dark
- **C01**: Fund
- **They have** … **ust let them do whatever they want**

Theori … want,

so … Too … oute e

th … e

Perh … nes

from … Bu … **uld** … e to

be the other way around

measurements

3 pillars of science (theory)

4 approaches (expt, obs)

	[A01] Inflation Sasaki (Kyoto)	[A02] fluent. & struct. Takahashi (Tohoku)	[A03] Dark Energy Sugiyama (Nagoya)
[B01] CMB polariz. Hazumi (KEK)	ζ, r, n_s direct evidence	CMB lensing isocurv. m_ν, N_ν	cosmo. params CMB lensing
[B02] Subaru galaxy imaging Miyazaki(NAOJ)	Lensing → $b(k)$ $\rightarrow P_{\rm primod}(k)$	weak lensing m_ν non-std. DM	weak lensing SNe, γ
[B03] galaxy spectroscopy Takada(KIPMU)	primord. NG Ω_K, n_s, α_s	isocurv. DM in dSph gals. $P(k), m_\nu$	BAO, RSD $\Omega_{\rm de}(z), \gamma$
[B04] TMT Usuda (NAOJ)	QED coupling (α) space time var.	Lyman-α forests IGM	direct detection of acceleration

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Synergy between the groups is the most important success criterion!

C01: ultimate theory Ooguri(Caltech)

[A01]インフレーション 佐々木(京都大)

[A02]揺らぎと構造 高橋(東北大)

[A03]ダークエネルギー 杉山(名古屋大)

[B01] CMB偏光 郡(KEK)

[B02] すばる銀河イメージング 宮崎(NAOJ)

[B03] 銀河分光 高田(KIPMU)

[B04] TMT 臼田(NAOJ)

ζ, r, n_s 直接検出

Lensing → $b(k)$ → $P_{primod}(k)$

primord. NG f_{NL}, n_{fs}, α_s

微細構造定数(α)の空間・時間変化

CMB lensing isocurv. m_ν, N_ν

weak lensing m_ν non-std. DM isocurv. DM in dSph gals. $P(k), m_\nu$

Lyman-α forests IGM

cosmo. params CMB lensing

weak lensing SNe, γ

BAO, RSD $\Omega_{de}(z), \gamma$

宇宙加速膨張の直接検出

X00: organization Murayama (IPMU)

D01: ultimate analysis Komatsu(MPA)

Your home work:
Think about grant proposals!

- This project comes with opportunities for 14 participating proposals in JFY2015!
  - E01: Theoretical and/or numerical study related to the evolution and structure of the Universe ~9 <¥1M
  - E02: Experimental and observational study related to the evolution and structure of the Universe ~2 <¥2M
  - E03: Study that can bridge between theoretical, numerical and experimental/observational studies related to the evolution and structure of the Universe ~2 < ¥4M