(Personal) Summary

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Miyoshi & Kihara (1975)

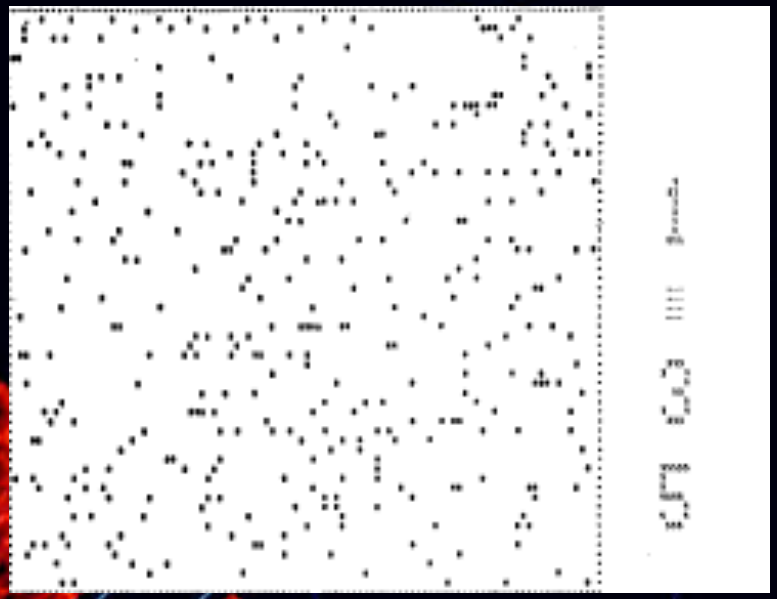
1/4 century

Evrard et al. (2002)

IAU symposium 216

"Maps of the Cosmos"

July 14, 2003, Sydney, Australia



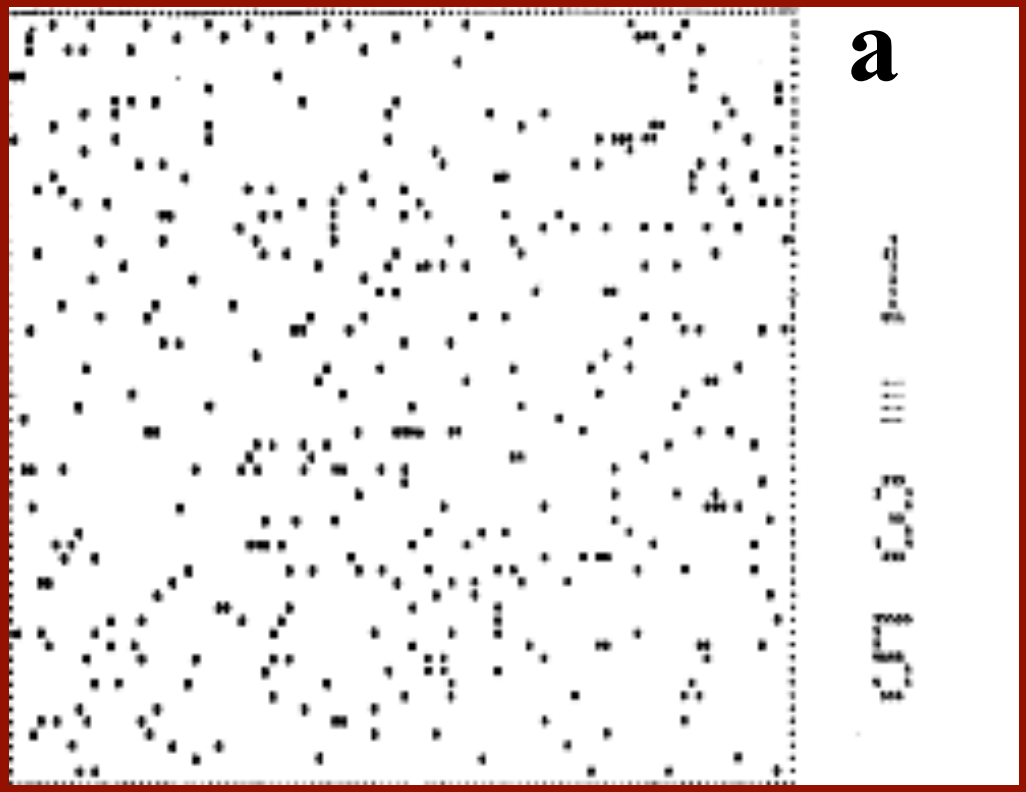
Simulations of large-scale structure in the new millennium

Yasushi Suto

Department of Physics, University of Tokyo

The first views of large-scale structure of the universe ***traced by M***

Gif animation from ADS scans



Miyoshi & Kihara
PASJ 27 (1975) 333

- N=400
- White-noise initial condition
- Comoving coordinates in the Einstein – de Sitter universe
- Periodic boundary condition
- Plotted on line printer papers (probably using "M" to represent particles to maximize the area)

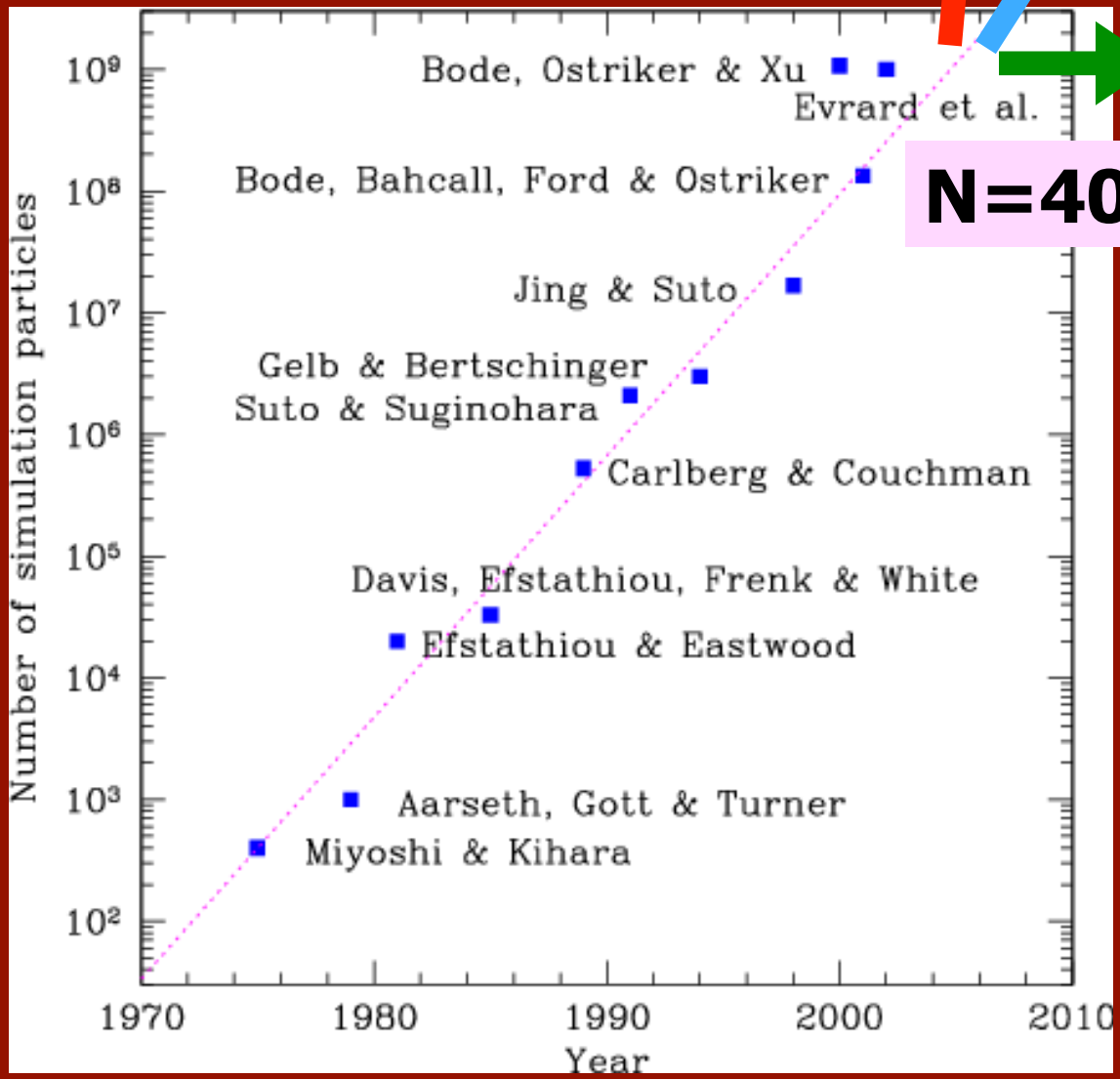
The first movie of cosmological N-body simulations

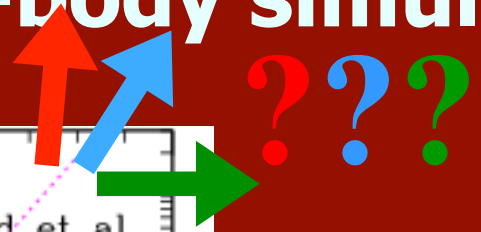
a (scale factor)

- N=1000 (400Kbyte memory)
- White-noise initial condition
- Expanding sphere in the Einstein – de Sitter universe
- a=1 to 30

Courtesy of Ed Turner (Princeton):
digitized from his old 16mm movie film (2min30sec)
on the basis of Aarseth, Gott, & Turner (1979)

Well-known exponential evolution of "N" in cosmological N-body simulations

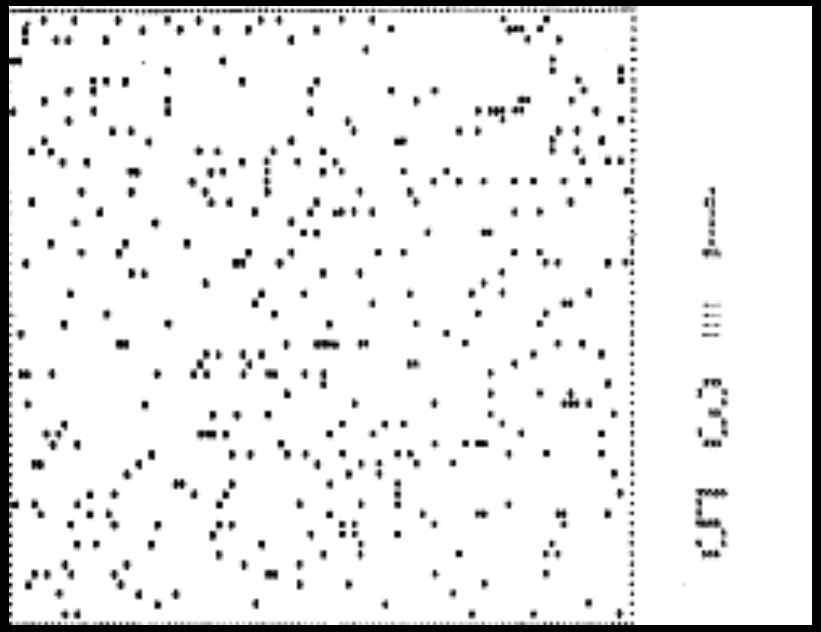


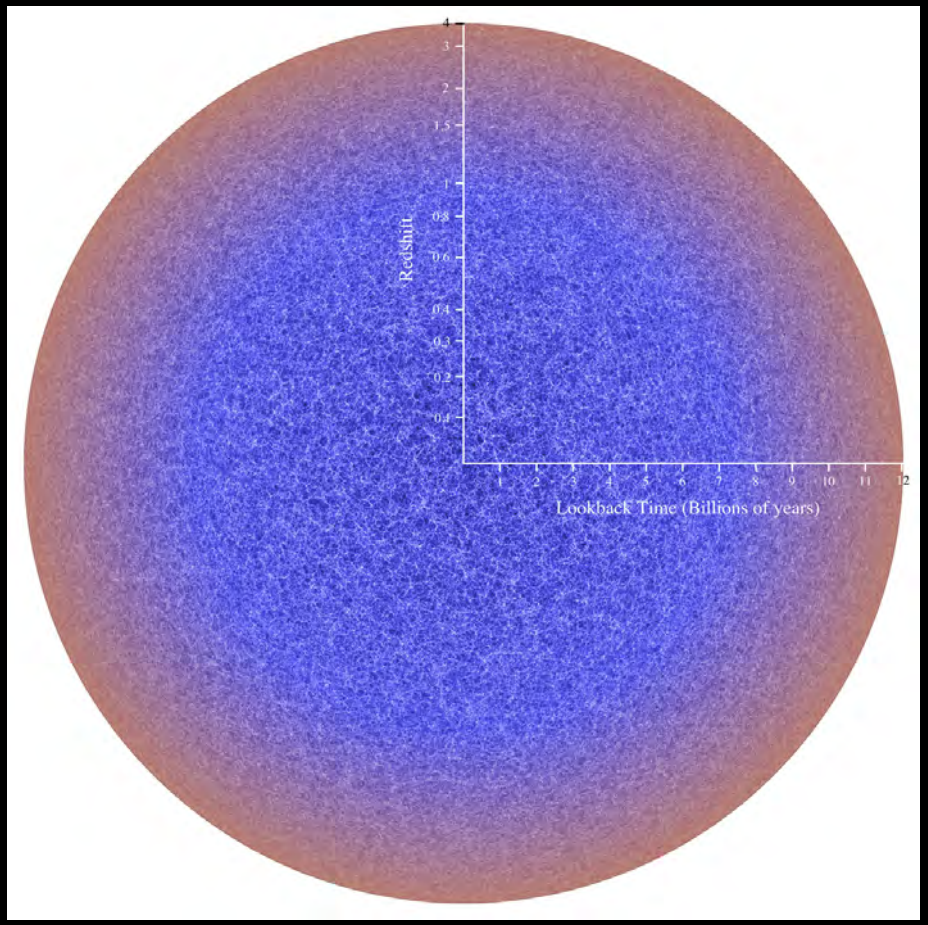


$N=400\times10^{0.215(\text{Year}-1975)}$

- The number of simulation particles in a $(1h^{-1}\text{Gpc})^3$ comoving cube exceeds the real number of CDM particles in the box
  - December, 2348 (if $m_{CDM}=1\text{keV}$)
  - February, 2386 (if $m_{CDM}=10^{-5}\text{keV}$)

Miyoshi & Kihara (1975) vs. Horizon 3 run (Kim, Park, Rossi, Lee & Gott 2011)





Falsifying my empirical formula against Horizon Run 3 by Kim et al. (2011)

- $N(Year)=400 \times 10^{0.215(Year-1975)}$ (Suto 2003)
  - $N(2011)=2.2 \times 10^{10}$ predicted
  - $N(HR3)=7210^3=3.7 \times 10^{11}$ achieved
- Important Lessons
  - Never forget non-linear effects !
  - Progress (in cosmology) is amazingly rapid, especially in Korea !
  - I should not compete with Changbom for larger N

The 1st KIAS International Workshop on Cosmology and Structure Formation

Oct. 28-29, 2004 KIAS, Seoul

1. Morphology and luminosity dependence of clustering of SDSS galaxies; two-point and three-point correlation functions (Kayo et al.)
2. Topology of large-scale structure from the Minkowski functional analysis of SDSS galaxies (Hikage et al.)
3. Phase correlation of SDSS galaxies (Hikage et al.)
4. SDSS QSO lens survey (Inada, Oguri, et al.)
5. Constraining the departure from Newtonian gravity using SDSS galaxy power spectrum (Shirata et al.)

In 2004, Korean culture started to be trendy in Japan: change is always rapid

Winter Sonata is a South Korean television drama series broadcast by KBS in 2002. It was broadcast on Japan's NHK and has been a major part of the Korean wave both there and throughout Asia. (Wikipedia)

About 340,000,000 results (0.21 seconds)

Google Search: Big bang

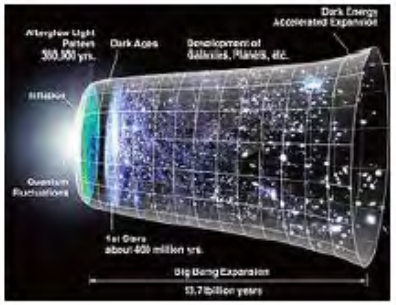
Big Bang (South Korean band) - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/**Big_Bang**_(South_Korean_band) - Cached
Big Bang (Korean: 빅뱅; commonly stylized as **BIGBANG**) is a South Korean male band under the management of YG Entertainment. Formed in 2006, **Big Bang** ...
G-Dragon - Big Bang discography - Alive (EP) - TOP (entertainer)

Big Bang - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/**Big_Bang** - Cached

Web
Images
Maps
Videos
News
Shopping
Blogs
More

Any time
Past 24 hours
Past week
Custom range...

Related searches: **top** big bang | big bang **theory** | big bang **korean** | big bang **album** | **super junior**





Google Search: Supernova band

Supernova (disambiguation) - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/**Supernova**_(disambiguation) - Cached
Bands. **Supernova** (American **band**), an American pop/punk trio; **Supernova** (South Korean **band**), aka Choshinsung / Cho Shin Sung, a Korean male group ...
In astrophysics - In visual media - In music - In computing and computer games

Supernova (American **band**) - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/**Supernova**_(American_**band**) - Cached
Supernova is an American pop punk **band** formed in Costa Mesa, California in 1989. The **band** has released three full-length albums, numerous singles and ...

Supernova (South Korean **band**) - Wikipedia, the free encyclopedia
en.wikipedia.org/wiki/**Supernova**_(South_Korean_**band**) - Cached
Choshinsung (Korean: 초신성, Chinese: 超新星; pinyin: Chāoxīnxīng, Japanese: 超新星 Chōshinsei, all lit. "**Supernova**") is a South Korean boy **band** formed ...

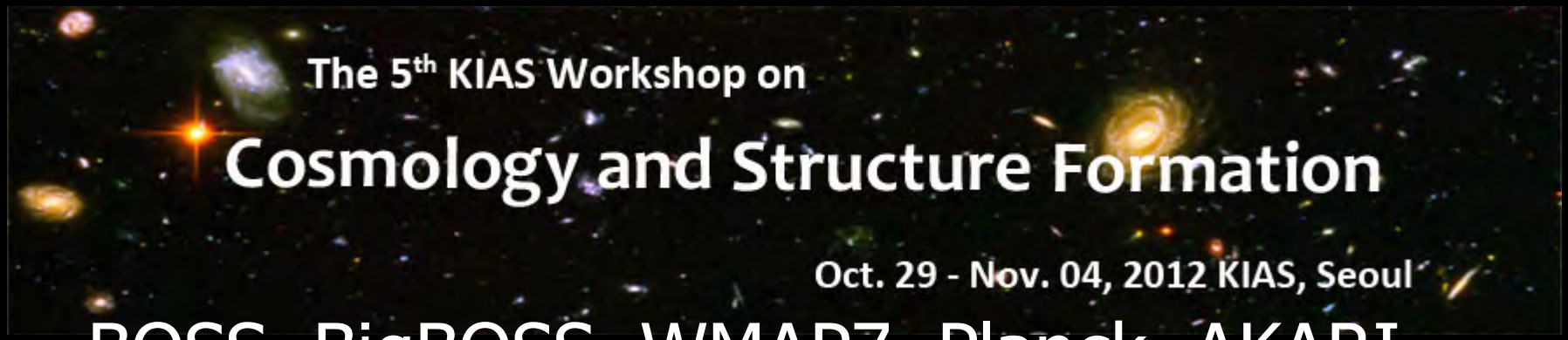
See results about

Supernova
American band
Supernova is an American pop punk ...

Choshinsung
Choshinsung is a South Korean boy band formed under Mnet ...

History of cosmology in Korea

- 1st KIAS workshop (2004)
- 2nd KIAS workshop (2006)
- Big Bang (2006-present)
- Supernova (2007-present)
- 3rd KIAS workshop (2008)
- 4th KIAS workshop (2010)
- Nobel Prize for Supernova (2011)
- 5th KIAS workshop (2012)
- Strongly influenced by Changbom !



- BOSS, BigBOSS, WMAP7, Planck, AKARI, astro-H, eROSITA, Subaru HSC/PFS
- Horizon run simulations
- Non-Gaussianity: genus, minkowski functions
- CMB B-mode due to primordial gravitational wave
- Reionization, kinematic SZ
- BAO, improved perturbation theories, modified gravity

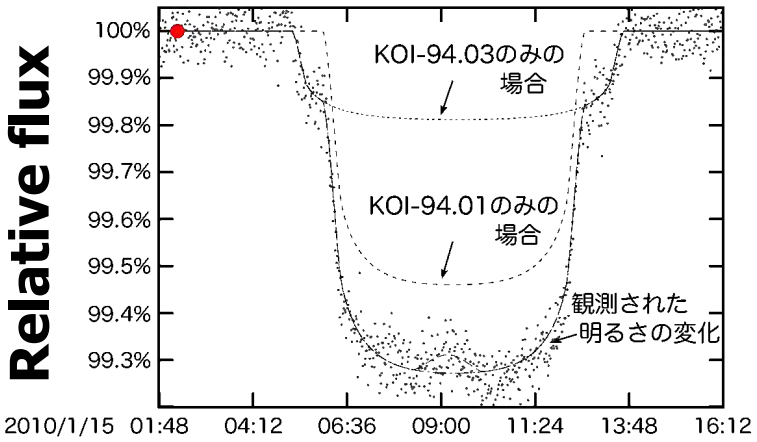
Take-home message: "progress in cosmology"

The prosperous must decline
The proud do not endure
The mighty fall at last,
they are as dust before the wind

"The Tale of the Heike"

You might want to apply the message to your **favorite** boss, supervisor, mission, project, company, country, or whatever.

KOI-94: the first planet-planet eclipse of 4 transiting planetary system



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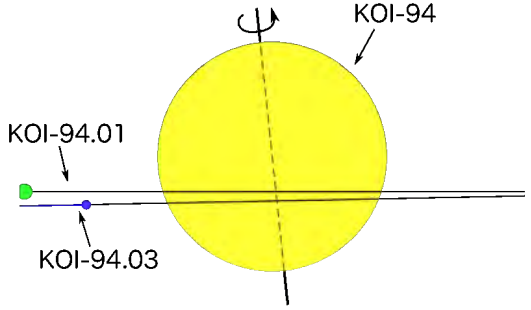

I decided to work on N=3-body problem, instead !

Miraculous alignment !

Next planet-planet eclipse event is predicted in 2026 !

Hirano et al. ApJL 759(2012)L36 November 10th issue

Kepler archive photometry + Subaru radial velocity

Conclusions

- Unexpected discoveries and amazing surprises in cosmology and astrophysics are just waiting for us, especially in Korea
- This is why we have to meet here again at the 6th KIAS workshop in 2014
- Let us thank all the participants for great talks and discussions, Juhan Kim, Jeong-sun Hwang, Yun-Young Choi and other LOCs for comfortable workshop organization, and of course **Changbom Park** for wonderful hospitality.