

***PHILOSOPHY OF
COSMOLOGY 2009:
CHARACTERISING
SCIENCE AND BEYOND***

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**An overview:
what we are trying to accomplish**

Topic:

Cosmology is in a fantastic data-rich era, but it is also coming up against the limits of measurement.

In the quest for ever deeper explanation, proposals are being made that are exciting, speculative, and of great explanatory power, but they are also sometimes untestable not just in practice but in principle.

For those who believe that the essential ingredient of science is experimental or observational verification, this is very problematic.

Question: are these proposals genuine science?

Do they amount to redefining the nature of science?

The most severe of these proposals is the multiverse, which has been proclaimed to be the new paradigm in cosmology, but where virtually all of the proposed explanatory model is beyond all observational reach even in principle.

Now these models are indeed very useful in an explanatory sense, so the issue is which of the meta-principles of science should be most important? How should we balance them?

For example:

- Testability: by observation or experiment
- Explanatory power
- Unification of explanation
- Simplicity (Ockham's razor)

Is it Ok to choose explanatory power and unification as key criteria, to the exclusion of testability?

Need to propose how we should characterise science in a way useful in this context, and test the proposal not only in the multiverse context, but in others where doubtful contenders are waiting in the wings, as well as in cases where we feel we are dealing with solid science:

- Standard cosmology (expanding universe)
- Inflationary universe epoch
- Evolutionary theory (Darwin)
- Intelligent Design
- Astrology
- Parapsychology

If we have a good definition of `science', it should work satisfactorily in these cases. Then we can apply it to multiverses, and see what the conclusion is.

Maybe this is too naïve: then what else should we do?

Purpose of meeting: to develop these themes

How did it come about?

- GE Contacted Joe Silk to see if he was interested
- He liked the idea and ran with it

- We set up SOC: joined by Simon Saunders, John Barrow, Jeremy Butterfield
- Negotiated funding from John Templeton Foundation

- Complex process of negotiation developed a very carefully focused and honed programme with an excellent set of participants
- Joe agreed to act as local host with Vanessa as organiser

- A highly talented set of participants agreed to come

Result:

- A highly focused conference to look at this issue (not just yet another conference on cosmology)
- Unique in terms of bringing together philosophers of science and high level scientists to look in depth at a specific theme (in the face of the hostility to philosophy of science by some scientists)
- The main part of the meeting is aimed at seeing the scientific utility of multiverses (do they really represent scientific theories?).
- The evening talks are more aimed at their philosophical uses: do they really solve the major philosophical issues of cosmology?

DAY 1: SUNDAY 20th SEPTEMBER

MORNING: COSMOLOGY

This is an introductory session that explains the multiverse concept as it arises in contemporary cosmology and string theory to non-experts.

AFTERNOON: PROBABILITY AND BAYESIAN EPISTEMOLOGY

This session concentrates on broad questions of Bayesianism, probability, fine tuning, and anthropic arguments, but with some attention to quantum mechanics.

EVENING: ULTIMATE EXPLANATION

Ultimate Explanation: Reforging Natural Philosophy,

DAY 2: MONDAY 21st SEPTEMBER

MORNING: THE CASE FOR MULTIVERSES

Scientific Justification of Multiverses, Probabilities in the landscape, Probability measures and initial data for inflation

AFTERNOON: FINE TUNING AND ANTHROPIC ARGUMENTS

General issues of fine tuning, and explanations of fine tuning in inflationary cosmology, string theory, and the Everett interpretation of quantum theory

EVENING: CONFERENCE DINNER

Cosmology, Ultimate Causation and Multiverses

DAY 3: TUESDAY 22nd SEPTEMBER

MORNING: THE CASE FOR MULTIVERSES

The case in support of them, plus critical comments

AFTERNOON: PHILOSOPHICAL ASSESSMENT OF THE SCIENTIFIC CASE

Philosophy of science critique of the various arguments for and against the multiverse

COSMOLOGY AS A SCIENCE

Broad perspectives on the nature of cosmology as empirical science

EVENING

Why is there something rather than nothing?

Concluding remarks

What will remain of the meeting in six months, a year, five years from now?

To have longer term effect:
Should be available more widely

- Some kind of publication

1: Recording and Webcast

- Joe to speak on this

2: A book?

- Maybe, If there seems to be consensus it is worthwhile

Thanks:

Joe Silk, Simon Saunders, John Barrow, and Jeremy Butterfield, who developed it and put a huge amount of work into fine tuning the proposal in a long and entertaining exchange

Templeton Foundation for funding the project
(Hyong Choi, Michael Murray)

Vanessa and LOC for making it happen

Participants for attending, and agreeing to talk on the topic rather than presenting their latest exciting research work

