

This is the state of art... and open questions?

We need to probe the very early stages of the Universe, to understand how it evolved from the Big Bang, i.e. from the pure hydrogen in form of gas, to the 'monster' and 'mini' BHs.

→ how and when the 'first stars' were built is one of the fundamental question.

- Need for more powerful Space Observatories

→ there is a need to maintain a FULL ACCESS to the whole electromagnetic spectrum

- There is a solid plan for Ground Based facilities (SKA- $\frac{1}{2}$ Australia, $\frac{1}{2}$ South Africa!, ELT, CTA) that must be complemented by the space-segment to get the full picture of how the Universe originated and what is it made off.

We have a unsecured future for Large space missions

***These was the basic motivation for the establishment of the
COSPAR Working Group “Future of Space Astronomy” on
April 2010***

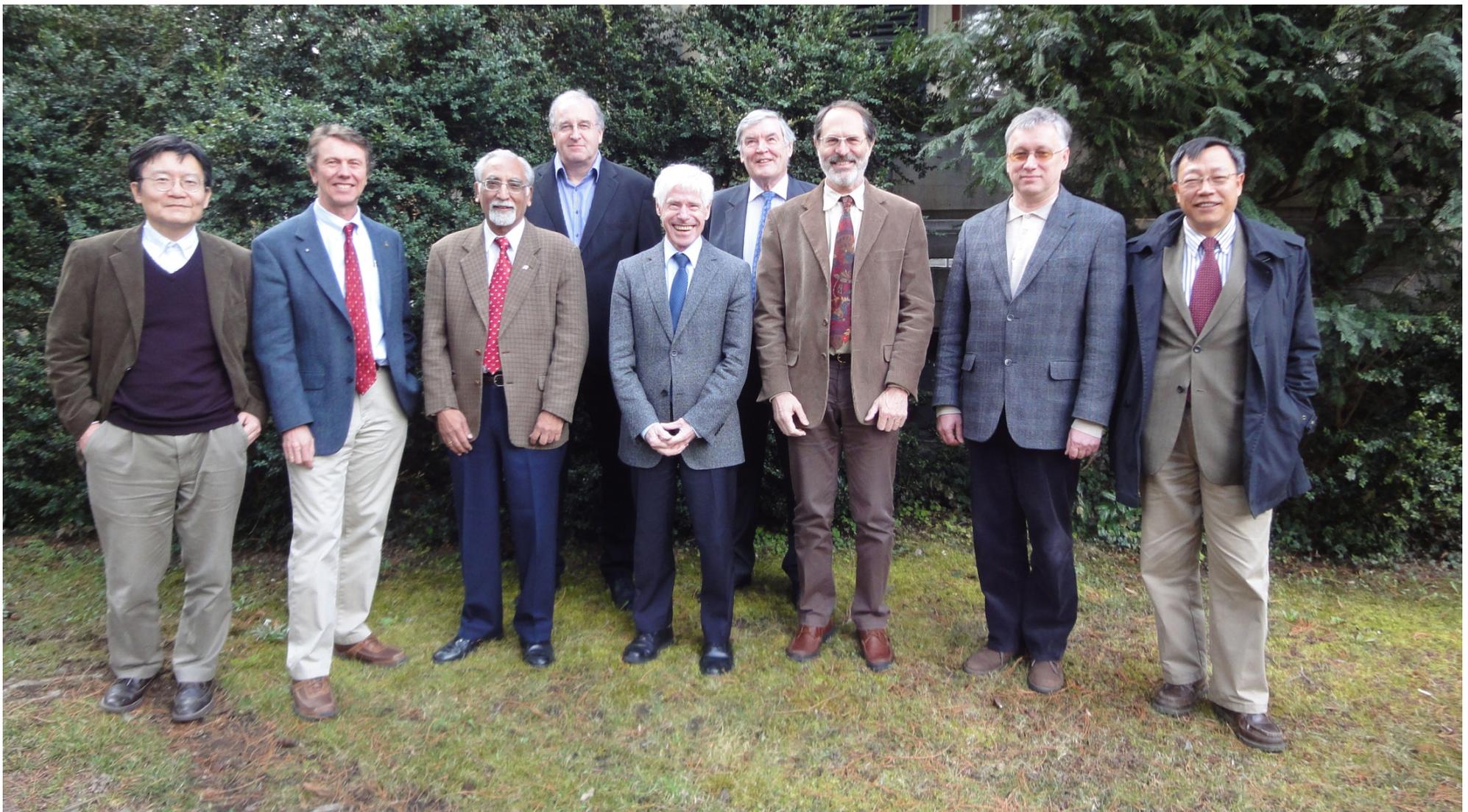


Prof. R. M. Bonnet,
former COSPAR President



Prof. G. F. Bignami,
COSPAR President

- ***Having assessed the scientific needs and the current plans of the main space agencies worldwide, the Working Group has now almost finished its work.***
- ***The basic outcome is going to be published as “Invited Review Paper” on ASR...you have the Executive Summary***
- ***The WG has identified some major concerns about the lack of a secured future for Space Astronomy***



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Members not present at the Bern meeting: Paolo De Bernardis, Mike Hauser, Marcos Machado

Basic working Group considerations

- *Astronomers need access to the complete electromagnetic spectrum which requires ambitious and powerful observatories as multi-national **ground based** projects as well as **large space missions** based on international cooperation and coordination.*
- *If international cooperation **will not be implemented**, new missions **may not be as powerful as they could** and may result in unnecessary duplication or not occur at all.*
- *The WG believes that the scientific community at large must find ways to provide the necessary encouragement and support to space agencies, **and help create the conditions in which international cooperation can bring about a better scientific outcome for all.***

Today operational space observatories cover the whole electromagnetic spectrum and complement ground based telescopes/arrays:

from the IR, sub mm - *Herschel & Planck* - to the near UV, visible - *Hubble* - to the X-Rays - *Chandra & XMM-Newton, Suzaku etc* - to the soft γ -rays with *INTEGRAL & SWIFT* - to the higher energy - *Agile & FERMI*.

Some are operational since *more than 10 years* and may not be available in the next decade.

→ the delay of the JWST launch to 2018 → and the extra cost (>1.5 M\$/day) is a major concern for the COSPAR WG.

