

Jayant V. Narlikar

ICGC-87 AS I SEE IT

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**A nostalgic and irreverent
look at the first
International Conference on
Gravitation and Cosmology -
1987**

14 - 19 DECEMBER, 1987

Exactly 24 years ago!



**Original Motivation for holding the Meeting:
As a stepping stone to hosting the GR -
Conference**

POST-SCRIPT

**India successfully organized the GR-15
in 1997**

**At the Inter-University Centre
for Astronomy and Astrophysics
in Pune**



The ICGC experience certainly helped ...

ORGANIZATIONAL DETAILS

Financial Sponsors:

- ▣ **Tata Institute of Fundamental Research, Mumbai made the major financial contribution to the meeting.**
- ▣ **Other sponsors included DST, ICTP, IAGRIG, IIA, IISc, IMS, IP, PRL, RRI, UGC**

LOCAL ARRANGEMENTS

- ▮ **JVN (then at TIFR) was the main organizer assisted by Ajit K. Kembhavi. AKK and Kumar Chitre did a “casing of the joint”.**
- ▮ **From the university sector Naresh K. Dadhich helped.**
- ▮ **Local assistance from Mr. Percival Noronha and the Association of Friends of Astronomy in Goa**



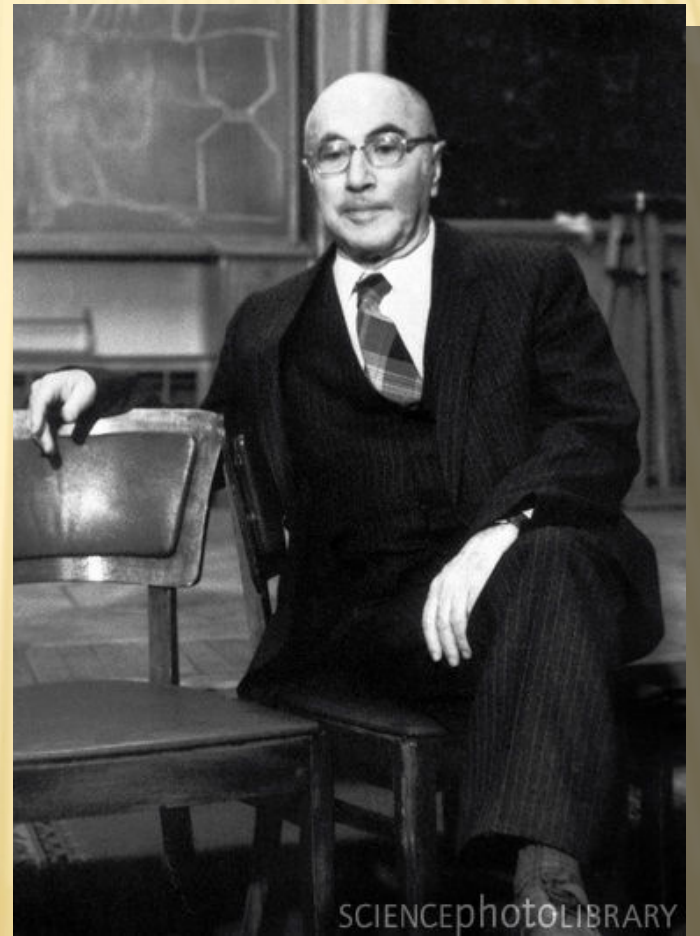
SOC

- ▮ **Chair: Vishu**
- ▮ **Abhay Ashtekar, John Barrow, Bruno Bertotti, Dieter Brill, Bernard Carr, Jim Hartle, Bei-Lok Hu, Bala Iyer, Malcolm MacCallum, JVN, Igor Novikov, Roger Penrose and Dennis Sciama**



THE OPENING SESSION

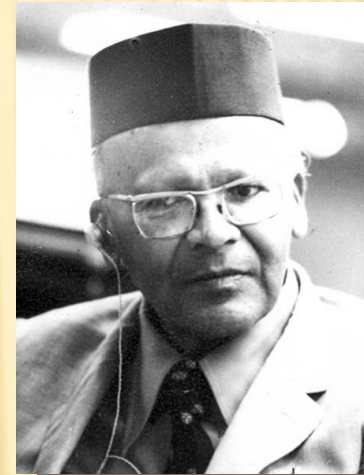
- The news of the passing away of Ya. B. Zel'dovich on December 2 was still fresh in delegates' mind and Malcolm Longair, on behalf of the conference paid glowing tributes to him...



SCIENCEPHOTOLIBRARY

HONORING THE DOYEN OF INDIAN GR

In the 1930s two schools of research were responsible for the growth of GR in India.



These were led by:

- ▣ **V.V. Narlikar (1908-91) at Banaras**
- ▣ **N.R. Sen (1894 -1963) at Calcutta**

VVN was present at ICGC-87 and was honoured by the Conference



THE V-R COMBINATION

After VVN, the community has looked up to two seniors,

one whose research started in

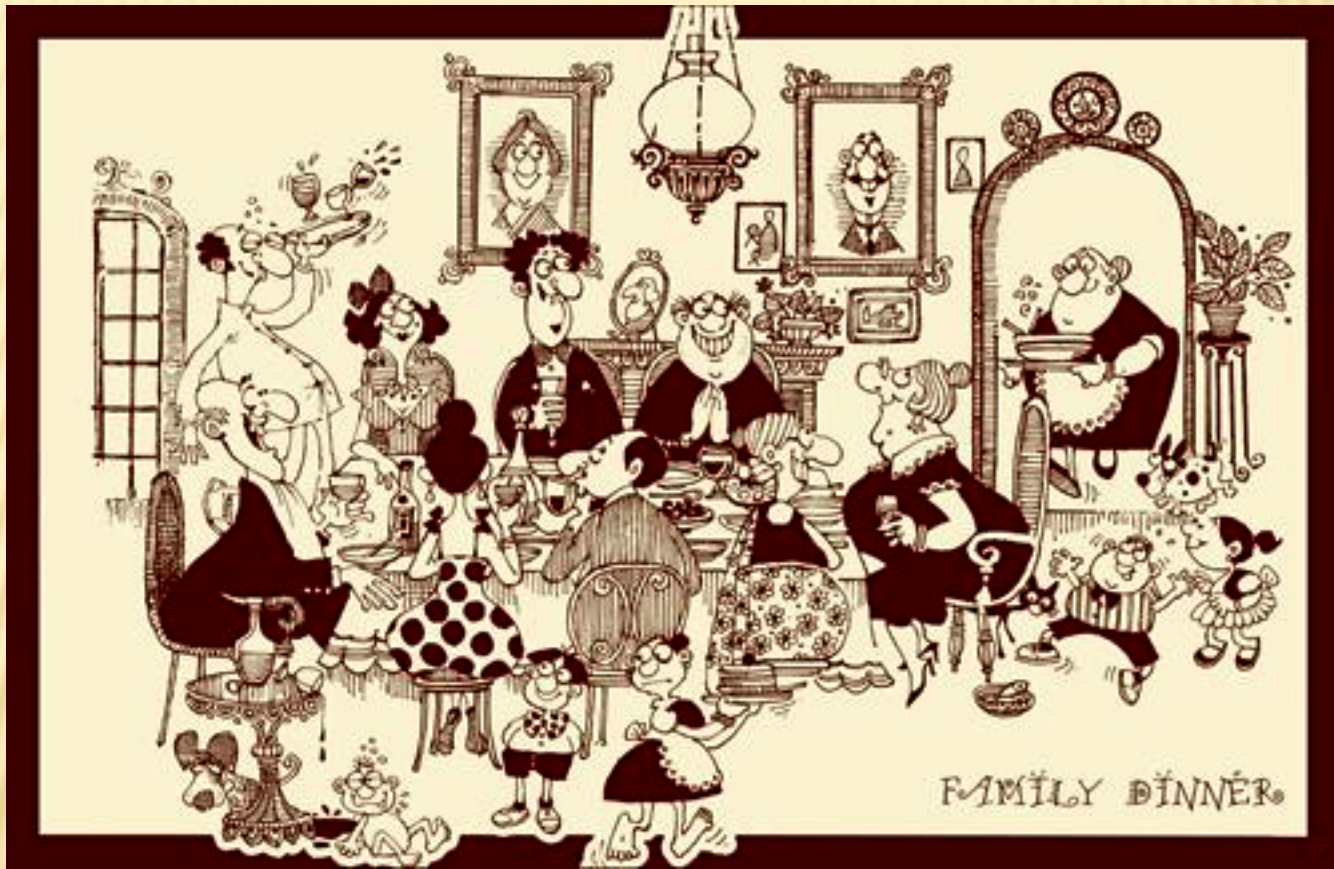
▫ Banaras:

P.C. Vaidya (Vaidya Solution)

▫ And the other in Calcutta:

A.K. Raychaudhuri (Raychaudhuri Equation)





THE CONFERENCE MENU

[Prix fixé: Registration fee]

Classical Relativity

...

Quantum Gravity

...

Cosmology

...

Black Holes and Compact Objects

...

**Gravitational Radiation and Gravity
Experiments**

WORKSHOP MENU

[A la carté]

Exact Solutions

...

Quantum Gravity and New Directions

...

Early universe and structures

...

**Relativistic Astrophysics and Black
Holes**

HIGHLIGHTS OF RESULTS PRESENTED

▫ MacCallum on Exact Solutions:

Number of terms in equations of Newtonian gravity is 3, while that in GR is 79680.

Important: Where is the physics?

→ Some practical suggestions for future work...

Numerical methods did not get a mention!

WORKSHOP ON EXACT SOLUTIONS

- **Xanthopoulos**, as coordinator mentions that because of a boat trip his session was threatened with time-cut...but as the boat developed a fault and the trip was delayed by two hours, they had plenty of time.
- Closing remarks by **P.C. Vaidya** urged the use of both parts of the brain...left and right ...left for analytical and mathematical approach and right side for physical significance.

QUANTUM GRAVITY

Approach from two ends:

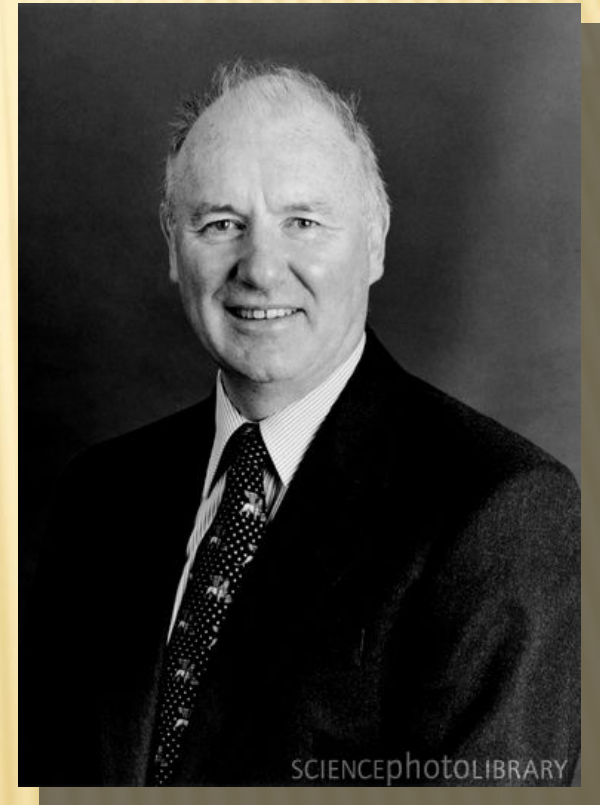
- 1. Quantum field theory in curved spacetime**
- 2. Physics in quantized spacetime geometry**

Despite intellectual stalwarts working in the field, the solution lies at a distance (on the Rindler horizon?)

TWO VIEWS ON COSMOLOGY

Malcolm Longair: A conventional view

- *Preferred Hubble's constant $\cong 50$ km/s/Mpc*
- *At present there is no observational evidence which demands that Λ is nonzero, nor is there any convincing theoretical motivation...I believe that all the evidence on distant galaxies is consistent with values of q_0 in the range 0 to 1.*



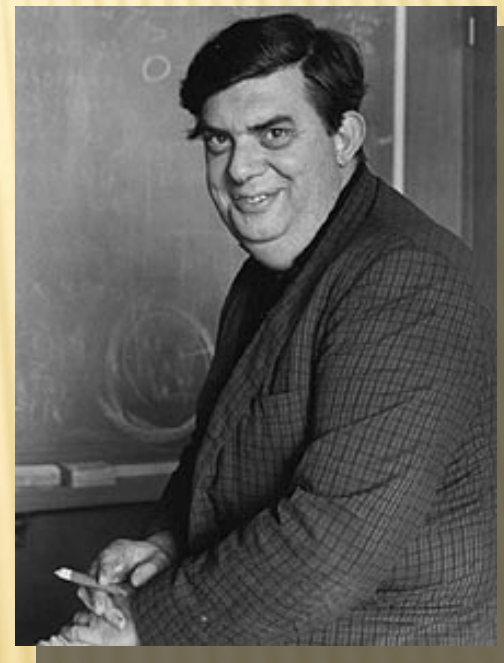
MALCOLM LONGAIR: CONVENTIONAL VIEW

CMBR problems that have since gone away

- Excess radiation near the peak with temperatures 2.963K and 3.150 K
- Lack of any departure from homogeneity

GEOFFREY BURBIDGE: THE HARMONIOUS AND THE DISCORDANT FACTS

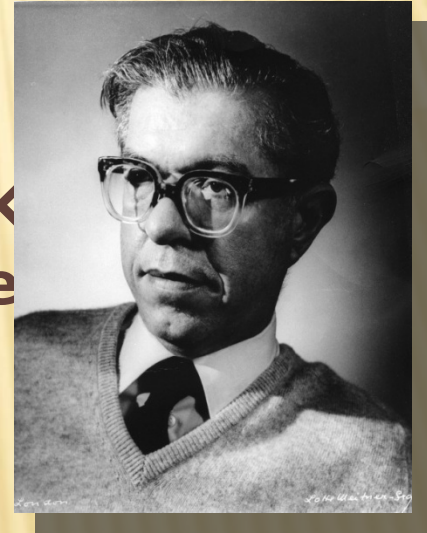
- Original Hubble diagram redrawn does not clearly show a linear relationship...
- q_0 measurements not clearcut in selecting a model...
- **Inflation implies $\Omega = 1$...
what is the direct evidence for it?**
- **Anomalous redshifts need to be investigated...**



FRED HOYLE ON CMBR

An alternative to big bang origin

- Why is the present temperature 2.7 K
- Can local starlight provide the source
- How to thermalize?



H \rightarrow He produced energy 6×10^{18} erg/g of helium.

Helium density $\cong 0.75 \times 10^{-31}$ g/cm³.

**So density of radiation =
 4.5×10^{-13} erg/cm³**

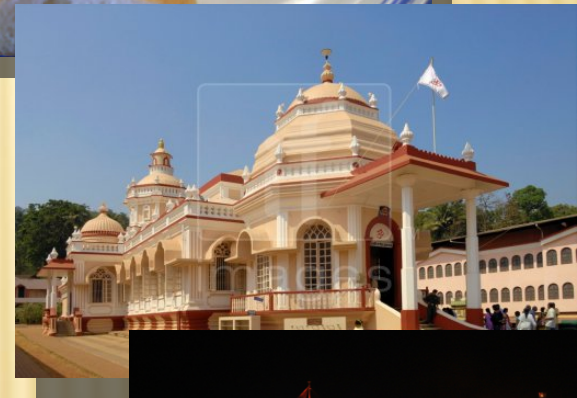
SOME OTHER TOPICS

- Carr on **dark matter**
- Chitre on **gravitational lensing**
- Brandenberger on **inflation, etc**
- Vishveshwara on **black holes**
- Wald on **b.h. thermodynamics**
- Dadhich on **physical processes near b.h.**
- Damur, Prasanna on **gravitational waves**
- **Summary** by Jurgen Ehlers



SIDE ATTRACTIONS

- ▮ Ethnic Goan Food at the celebrated and traditional Hotel Mandovi
- ▮ Visits to old temples and churches
- ▮ Cruise on River Mandovi on Goa C.M.'s boat followed by dinner on river bank

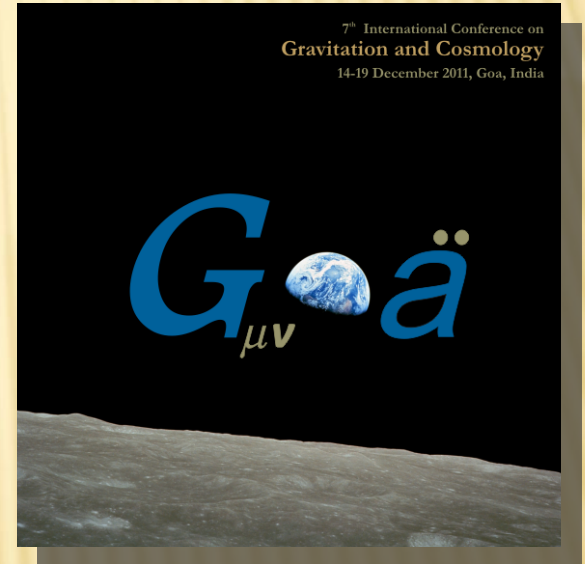


WHAT DOES ICGC STAND FOR?

- International Conference on Gravitation and Cosmology?

Perhaps...but better still, it stands for

- International Conference on Goan Conviviality



SOME ATTRACTIONS OF ICGC-87

**Cuisine at Hotel Mandovi:
Traditional Goan dishes
like vindalho, fejoada,
chicken xacuti, prawn
balchao, bebinca, formed
highlights of meals while
feni made from coconut
or cashew juice
prevented dry throats...**



FINALE: RIDE IN CM'S BOAT

- ▣ **Noronha's suggestion: Request the Chief Minister of Goa Pratapsingh Rane to host a dinner for the conference on the river bank, preceded by a ride in his catamaran...**
- ▣ **The CM agreed and also laid on folk dancing on the deck.**



A GOAN GREETING

"Khuxalbhorit Natalam"

(A Happy Christmas)