

Gravitational Waves:

How it all started (in India)!

Sanjeev Dhurandhar

IUCAA

$$\underline{t = 0 ? \text{ (or } t \lesssim 0)}$$

School: Gravitation in Astrophysics@Cargese 1986

Talk by Kip Thorne: GW detection and detectors



SVD



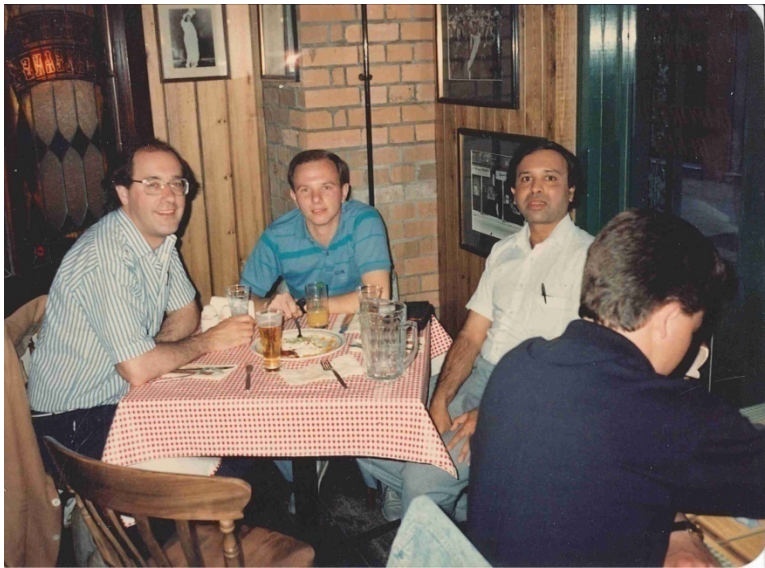
Schutz

Bala



Damour

Cardiff: $t = 0$? (or $t \lesssim 0$)



- $SO(3)$ tensor representations & antenna pattern functions
- SPA

$t = 0$: Joining IUCAA? - Justify yourself?

Joining IUCAA 1989 ($t \geq 0$)

Sathya, Patrick & SVD

The SPA paper **Rejected!**

Proposal for a 10-20 metre detector
from IUCAA to DST **Rejected!**

DST: **Get Experimentalists!**

Hold a workshop!

Wonderful advice!

100 metre detector proposal to DST

Experimentalists:

Centre for Advanced Technology, Indore: D. Bhawalkar

Workshop held at Indore in January 1990

Bernard Schutz, Brian Meers, Alain Brillet

Recommendation: 100 metre detector

Proposal to DST: P. K. Gupta, A. S. Raja Rao, SVD, Krishnan

DST: ***NO!***

Justifying our existence ...



20th August 2019

The future of gravitational waves
ICTS, Bangalore

The '90s: *Gravitational Waves don't exist!*

IUCAA:

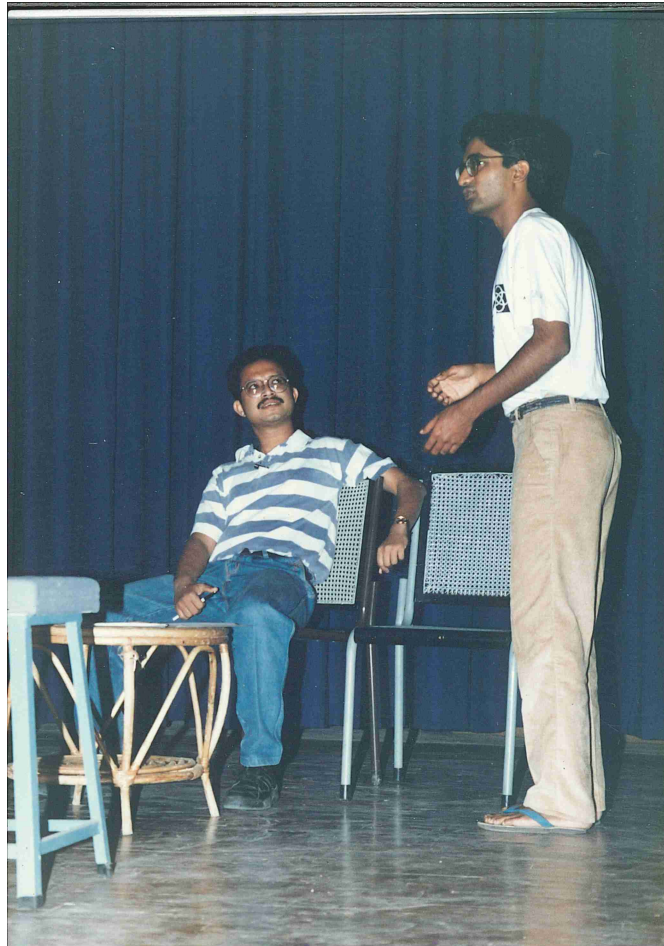
1. GW Data Analysis
2. Interferometric modelling
 - optical cavities with the Virgo group

Salient contributions:

- Search for inspiraling binaries (1991): BSS & SVD
- Differential geometric approach to GWDA (≥ 1990)
 - parameter space as a manifold, parameters as coordinates, induced metric on the signal manifold (1990) - **general**
- Hierarchical search for inspiraling binaries (1994-98)
- Coherent search for inspiraling binaries with a network of detectors (1998-2000)
- TDI (2001)
- Cross-correlation search for GWSB (2007), CW sources (2008)



Students: Examples



???

'90s: The post-Newtonian revolution – Kip Thorne

(BFS, SVD, AK are still kicking themselves!)

BRI@RRI in collaboration with French ...
The Post-Newtonian Approximations

- 1 PN
- 1.5 PN
- 2 PN
- 2.5 PN
- 3 PN
- 3.5 PN
- ...

Vital for the discovery

Students + Postdocs

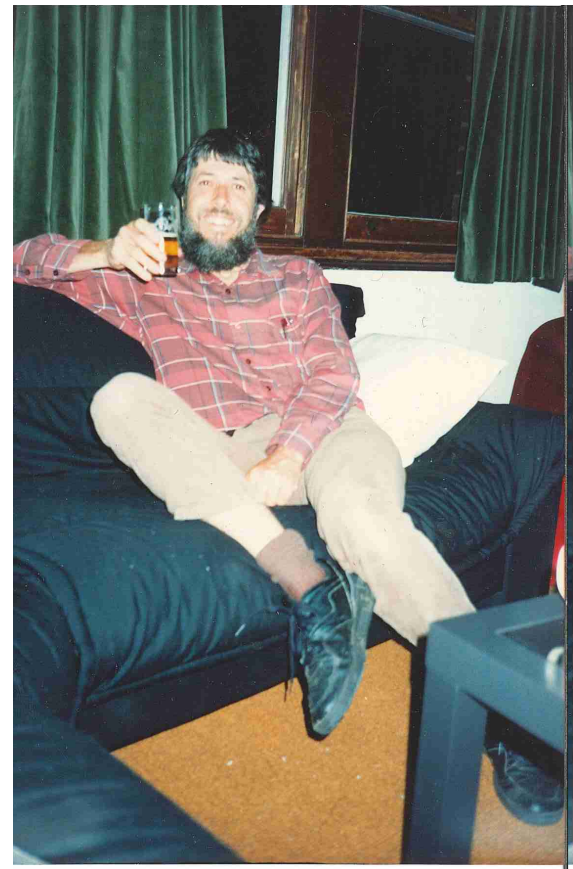


With the kangaroos: 1991 to 1998

Workshop@UWA (Cottesloe beach near Perth) in 1993:



David Blair



kangaroos & ticks

Bhawalkar & SVD



Indian role:
Data analysis (IUCAA)
Vacuum system (CAT)

26th Feb 1998



5 hour trek to the **Gingin** site near Perth (1998): Blair & SVD

Rana's Grandmother

ICGC 2007 @ IUCAA

Who should take the lead? Unni, SVD, BRI?

Hats off to Bala!

- 2009: IndIGO consortium formed

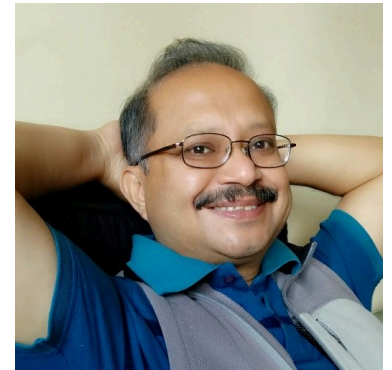
Q: Who should be the chair and spokesperson?

A: Obviously persons with maximum fault!

Chair:



Spokesperson:



SVD: **Soon found generally incompetent summarily fired**

$$2009 < t < t_{\text{current}}$$

Bala: Management of IndIGO



Tarun: (i) Site acquisition – LIGO-India
(ii) IUCAA project coordinator
(iii) Spokesperson



Discovery of GW and LIGO-India