KARNATAK UNIVERSITY

DHARWAD

NAAC Accredited with 'A' Grade - 2022

ε-Club, Department of Physics and Electronics
and
Dr. M. R. Gorbal Foundation, Bengaluru

Invite you to the

Dr. M. R. Gorbal Foundation Fifth Guest Lecture

on

Lecture 1: AI and the Cosmos

(10:30 am to 1 pm)

Lecture 2: Black Holes- Finding them, Measuring them, Seeing them

(2:30 pm to 3:30 pm)

By

Prof. Ajit Kembhavi

Professor Emeritus

Inter-University Centre for Astronomy and Astrophysics (IUCAA) PUNE

Date: 06-01-2026 Time: 10:30 am

Venue: S. Chandrasekhar Hall, Dept. of Physics, K.U. Dharwad

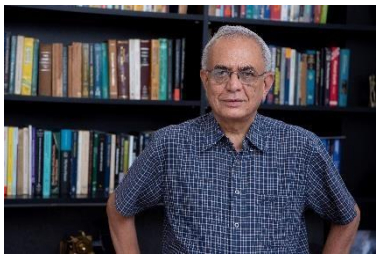
You are all cordially invited

Dr. A. S. Bennal
Chairman $\mathcal{E}$-Club
Department of Physics

Shri. Ramesh Gorbal
President
Dr. M. R. Gorbal Foundation

Prof. (Smt.) Jayashree J. Tonannavar
Chairperson
Department of Physics

Prof. Ajit Kembhavi
IUCAA



Ajit Kembhavi obtained his Ph.D. at TIFR, Mumbai, under the guidance of Professor Jayant Narlikar. He was then a postdoctoral Fellow at the Institute of Astronomy in Cambridge, and has held visiting positions in several centres in abroad. He is presently Professor Emeritus at the Inter-University Centre for Astronomy and Astrophysics (IUCAA), Pune. He is one of the Founders of IUCAA and was Director there until August 2015. He was a Visiting Distinguished Professor at IIT Kanpur. He led the Pune Knowledge Cluster (PKC) from 2020-24, which works on projects related to environment, sustainability, health, big data & AI, and capacity building. Kembhavi's research interest are in galaxies, quasars, high energy astrophysics mainly, but has worked in other fields of astronomy too. In the field of data driven science, Kembhavi has led the Virtual Observatory-India project for fifteen years, which has made important contributions to data management, analysis, visualisation and the development of tools for statistical analysis. He headed a Big Data project supported by the National Knowledge Network (NKN). Presently he is applying AI to diverse problems in astrophysics. Kembhavi has published a large number of research papers and several books in English and Marathi. He is involved in many national and international collaborations and is one of the key persons responsible for India joining the Thirty Meter Telescope (TMT) and the LIGO India projects. He has led the Virtual Observatory-India project and was Chair of the International Virtual Observatory Alliance. He has worked at many research centres and universities in many different countries. Kembhavi has been a member of the Space Commission of the Government of India and is presently a member of the ISRO's Apex Science Board. He was Vice-President of the International Astronomical Union, President, Astronomical Society of India and President, Indian Association for General Relativity and Gravitation. He is a Fellow of the Indian Academy of Sciences and the National Academy of Sciences, India.

Abstract:

AI and the Cosmos

Machine Learning, Deep Learning and other Artificial Intelligence (AI) techniques leading to Large Language Models have now become an integral part of development in every sphere of activity. These techniques are also important in the basic sciences and are now an inseparable part of scientific work. The techniques are particularly important in astronomy, where powerful telescopes routinely generate vast quantities of data. In my talk I introduce some basics of Machine and Deep Learning and some interesting applications of these techniques to Astronomy and beyond. I will also mention an interesting Citizen Science programme which will lead to creating a large astronomical training set for AI.

Black Holes - Finding Them, Measuring Them, Seeing Them

Black holes are enigmatic solutions of Einstein's theory of gravity. Over a century black holes have moved from being mere curiosities to a central role in modern astrophysics and cosmology. In my talk I will describe how black holes arise in general relativity, their nature, how they are found observationally, how we can measure the mass and other properties of black holes, and how the first image of a black hole was produced.

Dr. M R Gorbal Foundation, Bengaluru:

Dr. M R Gorbal served the Department of Physics, Karnataka University for over 35 years as a Professor and Chairman. He published several notable papers and guided several research scholars. To commemorate and honor his service and legacy, the Dr. M R Gorbal foundation was established in the year 2022, with a view to advancing scientific research. The foundation has signed MoU with Karnataka University on 18/01/2023 to support research scholar with the fellowship and sponsor lectures by eminent scientists in the department of Physics, at Karnataka university, Dharwad.

Previous Invited Special Lectures:

1) **Prof. S Umapathy** FNA
   Professor, IISc, Bengaluru, Former Director, IISER, Bhopal**,**
2) **Dr. Girish Manjunath Gouda**
   Indian Space Research Organization (ISRO), Bengaluru
3) **Dr. Sriram Ramaswamy** FRS
   IISc, Bengaluru,
4) **Dr. K Rajanna**
   IISc, Bengaluru