



WMO ARTS & SCIENCE COLLEGE, MUTTIL

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CRITERIA-3

3.5 Collaboration

3.5.1: MOUs/Linkages/Collaboration 2017-18.

Linkage between Department of Physics Vs Inter University Center for Astronomy and Astrophysics (IUCAA)

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Prof. A. N. Ramaprakash
Dean, Visitor Academic Programmes

June 23, 2023.

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Dr. Biju K.G., an Associate Professor from W.M.O. Arts and Science College, Muttill, Wayanad, Kerala, visited the Inter-University Centre for Astronomy and Astrophysics (IUCAA) during the following dates under IUCAA's Visitor Programme.

1. From October 29, 2017 till November 10, 2017.
2. From April 23, 2018 till May 22, 2018.
3. From December 27-31, 2018.
4. From July 20-22, 2019.

He worked under the able guidance of Professor Joydeep Bagchi, formerly a faculty member at this Centre and used the computing and library facilities at IUCAA for his research work.

IUCAA has paid him TA and DA as per norms, wherever applicable.

Prof. A.N. Ramaprakash
Dean, Visitor Academic Programmes
<anr@iucaa.in>

Prof. A. N. Ramaprakash
Scientist-H (Sr. Professor)
Dean, Visitor Academic Programmes
Head, Instrumentation
IUCAA, Pune-411007, INDIA

2. ACTIVITY REPORT

1. Paper Published with Prof. Joydeep Bagchi (IUCAA) as Co-Author.

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JOURNAL ARTICLE

'Zwicky's Nonet': a compact merging ensemble of nine galaxies and 4C 35.06, a peculiar radio galaxy with dancing radio jets ^{ORCID}

K. G. Biju , Joydeep Bagchi , C. H. Ishwara-Chandra, M. Pandey-Pommier, Joe Jacob, M. K. Patil, P. Sunil Kumar, Mahadev Pandge , Pratik Dabhade , Madhuri Gaikwad  ...
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Abstract

We report the results of our radio, optical and infrared studies of a peculiar radio source 4C 35.06, an extended radio-loud active galactic nucleus (AGN) at the centre of galaxy cluster Abell 407 ($z = 0.047$). The central region of this cluster hosts a remarkably tight ensemble of nine galaxies, the spectra of which

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‘Zwicky’s Nonet’: a compact merging ensemble of nine galaxies and 4C 35.06, a peculiar radio galaxy with dancing radio jets

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ABSTRACT

We report the results of our radio, optical and infrared studies of a peculiar radio source 4C 35.06, an extended radio-loud active galactic nucleus (AGN) at the centre of galaxy cluster Abell 407 ($z = 0.047$). The central region of this cluster hosts a remarkably tight ensemble of nine galaxies, the spectra of which resemble those of passive red ellipticals, embedded within a diffuse stellar halo of ~ 1 arcmin size. This system (named ‘Zwicky’s Nonet’) provides unique and compelling evidence for a multiple-nucleus cD galaxy precursor. Multifrequency radio observations of 4C 35.06 with the Giant Meterwave Radio Telescope (GMRT) at 610, 235 and 150 MHz reveal a system of 400-kpc scale helically twisted and kinked radio jets and outer diffuse lobes. The outer extremities of jets contain extremely steep-spectrum (spectral index -1.7 to -2.5) relic/fossil radio plasma with a spectral age of a few $\times (10^7 - 10^8)$ yr. Such ultra-steep spectrum relic radio lobes without definitive hotspots are rare and they provide an opportunity to understand the life cycle of relativistic jets and physics of black hole mergers in dense environments. We interpret our observations of this radio source in the context of growth of its central black hole, triggering of its AGN activity and jet precession, all possibly caused by galaxy mergers in this dense galactic system. A slow conical precession of the jet axis due to gravitational perturbation between interacting black holes is invoked to explain the unusual jet morphology.

Key words: galaxies: clusters: individual: Abell 407 – galaxies: elliptical and lenticular, cD – galaxies: jets – quasars: supermassive black holes – radio continuum: galaxies.

2. Organized the Regional Astronomy meeting on Research in Astronomy -Opportunities and Challenges, of IUCAA at WMO Arts and Science college, Muttil 1-2 December 2017.

ABOUT THE COLLEGE

WMO Arts & Science college is an aided college, affiliated with University of Calicut and accredited by NAAC with 'B' grade. The college is established in 1980 and managed by Wayanad Muslim Organisation (WMO), which is an endeavour to support the educationally and financially backward people of the region. The college is located in a beautiful hill area at Muttil, six km away from Kuppeta, the district headquarters. Presently it offers seven postgraduate programmes and 11 undergraduate level programmes. Department of physics was established in the year 1998 along with the inception of the college. In the beginning, it offered BSc physics programme (with mathematics and computer science as a subsidiary). Later, in 2002, it was upgraded to a postgraduate department.

THE VARIOUS TOPICS OF FOCUS IN THE CONFERENCE

1. Cosmology	2. Active Galactic Nuclei (AGN)
3. Stars and ISM	4. Galaxies and IGM
5. Gravitational waves	

RESOURCE PERSONS

1. Prof. Ranjeev Misra, IUCAA, Pune
2. Dr Annapurni Subramaniam, IIA, Bangalore
3. Dr V.C. Kuriakose, CUSAT
4. Dr. Rajeev Rajath, JK university
5. Dr. Paul KT, Christ University, Bangalore
6. Dr. Sajeeth Ninan Philip, St. Thomas, Kozhenchery
7. Dr. Joe Jacob, Newman college, Thodupuzha
8. Dr. Bina Joy, Alghorasra college, Pith
9. Dr. Charles Jose, CUSAT
10. Dr. Blesson Mathew, Christ University, Bangalore
11. Dr. CD Ravikiran, Calicut University
12. Dr. Jeeva Kandanathan, Providence college, Calicut

ORGANISING COMMITTEE

General Convener	Dr. T.P. Muhammed Fareed, Principal
Co-ordinators	Prof. Ranjeev Misra, IUCAA Dr. Joe Jacob, Newman College, Thodupuzha
Convener	Mr. Biju.K.G. WMO Physics
Members	1. Mr. Hazim NK 2. Mr. Joseph WV 3. Ms. Sureshtha KL 4. Fatima CK 5. Sharmila VP 6. Naveen Kuzhala 7. Anandya MS 8. Jutha of Mounth

REGIONAL ASTRONOMERS MEETING-IV

**"ASTRONOMY RESEARCH:
OPPORTUNITIES AND CHALLENGES"**

1 - 2 DECEMBER 2017

Organized by
Inter University Centre for Astronomy and
Astrophysics (IUCAA), Pune
&
Department of Physics,
WMO Arts & Science College, Muttil

Proposals for holding Workshops/Schools Outside IUCAA

Proposals to conduct workshops/schools in Astronomy and Astrophysics or related areas are invited from university departments/affiliated colleges and the same may be sent to the Administrative Officer, Core Programmes, (email; aocp@iucaa.in), IUCAA, by April 30, 2018 (for events to be conducted during August 2018 - July 2019), so as to be included in the academic calendar for the next academic year.

The following details should be given while sending the proposals: (i) the title (topic), (ii) duration of the workshop/school, (iii) topics to be covered and number of lectures in each topic, (iv) the level of audience and their number, (v) the number of resource persons available locally and the number of resource persons expected from IUCAA, and (vi) a description of the facilities available and (vii) the budget estimates (clearly stating the support offered by the host university/institute).

It is generally expected that infrastructural facilities and accommodation to the participants as well as the resource persons will be provided by the host institution. Other expenses will be borne by IUCAA. The proposers are encouraged to consult IUCAA faculty while framing the proposal.

Once the workshop/school is approved, IUCAA will nominate a coordinator from its faculty, who will interact with the organiser in relation to the academic programme, budget, and identifying and approaching the resource persons.

Welcome to . . .

Meeting on Research in Astronomy: Opportunities and Challenges



The south regional astronomers meeting on Research in Astronomy: Opportunities and Challenges was conducted at the Department of Physics, WMO Arts and Science College, Muttil, Wayanad, Kerala, during December 1 - 2, 2017. The fourth in the series of annual meetings, intended for fostering ties between astronomers in this region, was inaugurated by Ranjeev Misra (IUCAA), and presided over by T.P. Muhammed Fareed (Principal, WMO Arts and Science College). There were 27 presentations, each of 15 minutes duration, given by the research students from the region. New results from the fields of Cosmology, AGN, Stars, ISM, IGM, Galaxies, Gravitational Waves, Instrumentation, and Machine Language were presented. Active discussions which ensued after each presentation served to provide new insights and directions for the participating researchers. There were 7 review talks by senior faculty members in various aspects of Astronomy, and were given by V.C. Kuriakose (CUSAT, Kochi), Annapurni Subramaniam (IIA, Bengaluru), Charles Jose (CUSAT, Kochi), K. Indulekha (Mahatma Gandhi University, Kottayam), Blesson Mathew (Christ University, Bengaluru), and Sajeeth Ninan Philip (St. Thomas College, Kozhenchery)). Ranjeev Misra and Joe Jacob (Newman College, Thodupuzha) were the academic coordinators, and Biju K.G. (WMO Arts and Science College) officiated as the organising secretary. There were cultural programmes by the participants on the evening of the first day of the meeting.