CRITERIA-3

3.5 Collaboration

3.5.1: MoUs/Linkages/Collaboration
2017 - 22

Linkage between Dr. Biju K G (Associate Professor, Department of Physics, WMO Arts and Science College, Muttil) vs. National Centre for Radio Astrophysics

Sl No	Name	Page No:
	CONTENTS	
1	Document for Linkage	1
2	Activity Report	2

National Centre for Radio Astrophysics
TATA INSTITUTE OF FUNDAMENTAL RESEARCH

PUNE UNIVERSITY CAMPUS, POST BAG NO.3, GANESHKHIND, PUNE 411 007, INDIA
Telephone: (020) 2571 9228, 2571 9111; Extn: 228 Fax: 2569 7257
Email: ishwar@ncra.tifr.res.in

NCRA • TIFR

Prof. C.H. Ishwara Chandra
Professor (H) and
Dean, GMRT Observatory

July 4, 2023

Certificate of Collaboration for Dr. Biju KG

Dr. Biju KG (WMO Arts & Science College, Muttil) has been involved in research collaboration with the National Center for Radio Astrophysics (NCRA) since the beginning of his research in Astronomy in 2010. This collaboration has been facilitated through effective scientific discussions with NCRA scientists and by utilizing the facilities and training programs provided by NCRA for radio astronomy data reduction. As Principal Investigator (PI), he has submitted seven proposals for radio observations to the Giant Meter-wave Radio Telescope (GMRT), as well as four proposals as a co-investigator (Co-I). Out of these 11 proposals, ten were accepted for observation, and I was a co-investigator in nine of these projects. His recent proposals as a Co-I for GMRT observation include: 1. "GMRT mapping of eight episodic radio source candidates," and 2. "Exploring Episodic Jet Activity in Radio Loud AGNs: A Morphology-Independent Search and uGMRT Observation of Ten Candidate Sources.

With regards and best wishes,

Yours sincerely,

Ishwara Chandra C. H

Giant Metrewave Radio Telescope (GMRT), A National Project of the Government of India

1

ACTIVITY REPORT

LINKAGES WITH NCRA & NEWMAN COLLEGE.

Dr. Biju KG, Associate professor of Physics, WMO Arts and Science College, Muttil is having collaborative research activities with Prof. Ishwara Chandra CH (NCRA, Pune) and Dr. Joe Jacob and Ms Aparna Raj of the Newman college, Thodupuzaha. During the 2017- 2022 Dr. Biju KG is the co-investigator (Co-I) of the radio astronomy project entitled " GMRT mapping of eight episodic radio source candidates". This project is approved in the 42nd GMRT observational cycle with id 42_067. Ms. Aparna Raj (Assistant Professor, CMS college, Kottayam & Research Student, Newman college, Thodupuzha) is the Principal Investigator. Prof. Ishawara Chandra and Dr. Joe Jacob are also Co-I of this project.

Link: https://wmocollege.ac.in/uploads/GMRT_Project1.pdf

CONTENTS	
Sl No	**ITEM**
1	Screen shot of NCRA Archive and Proposal System(NAPS)- Biju Login
2	Coversheet of the project 42_067:" GMRT mapping of eight episodic radio source candidates"
3	E mail regarding observation on 16-07-2022
4	E mail regarding observation on 17-07-2022
5	E mail regarding observation on 18-07-2022
6	E mail regarding observation on 22-07-2022
7	E mail regarding observation on 04-08-2022
8	E mail regarding observation on 04-08-2022

1. NCRA Archive and Proposal System (NAPS) Screen shot.

2. Face sheet of the approved project.

GMRT Observing Application
Cycle No: 42 Primary Backend: GWB

(Note: This PDF is generated by version 1.44 coversheet generator script running in LaTeX mode)

Proposal Code: 42,067

Submission Date: 15-01-2022

Title: GMRT mapping of eight episodic radio source candidates

Related Proposals:

Abstract:

Radio loud Active Galactic Nuclei (AGN) are observed to exhibit episodic jet activity with the active phases being short term compared to the life time of the galaxy. The search for such episodic radio sources is a tedious process and most of the known ones were identified based on their morphology with clear two pairs of lobes (double-double radio sources). We have developed a new morphology independent method to look for radio sources with episodic activity based on the spectral index at low and high radio frequencies. The goal of this search is to increase the number of known episodic sources which may not follow clear double-double morphology. Using this technique, we have found over 100 candidate episodic radio sources by cross matching VLSS, TGSS, NVSS and PMN catalogues at frequencies ranging from 74 MHz to 4.8 GHz. Here we propose to observe eight new episodic radio source candidates from our sample with uGMRT at 250-500 MHz (band-3) and 550-850 MHz (band-4). These sources have significantly excess radio emission at low frequencies as compared to high frequencies (concave spectra). The main goals of this study is to understand its morphology, spectral index properties and to understand the origin of excess emission at low radio frequencies. We intend this observation to be a pilot study leading to an extensive survey identifying larger number of episodic sources. We request two hours per band for all the eight objects; 16 hours at 250-500 MHz (band-3) and another 16 hours at 550-850 MHz (band-4) with a total of 32 hours.

Proposers:

The first name on the list of proposers is the Principal Investigator for this proposal.

Proposer	Institution	Observer	Email	Nationality	PhD Student
Aparna Raj	Newman College	Yes	rajaparna45@gmail.com	INDIA	Yes
BIJU.K.G	WMOC	No	kgbiju42@gmail.com	INDIA	No
Joe Jacob	Newman College	No	drjoephysics@gmail.com	INDIA	No
C.H. IshwaraChandra	NCRA	No	ishwar@ncra.tifr.res.in	INDIA	No

Phd Students table:

Student	Project Title	Year of Completion
Aparna Raj	Investigation of the nature and environmental interactions of episodic radio sources	2023

PI Contact Details:

Address: Moolayil House
           Changanacherry
           Kurumpanadom P.O

3. Observation 16-07-2022

M Gmail

Biju koonammakkil george <kgbiju42@gmail.com>

GTAC Obs Log : 14386
1 message

gtaclog@gmrt.ncra.tifr.res.in <gtaclog@gmrt.ncra.tifr.res.in>
To: ishwar@ncra.tifr.res.in, drjoephysics@gmail.com, kgbiju42@gmail.com, rajapama45@gmail.com

Sat, Jul 16, 2022 at 9:12 AM

GTAC Observation Log

1. Date : 16/07/2022
2. Observation Sr. No. : 14386
3. Observer : Aparna Raj, BIJU.K.G, Joe Jacob, C.H. IshwaraChandra
4. Observer's Email : rajapama45@gmail.com, kgbiju42@gmail.com, drjoephysics@gmail.com, ishwar@ncra.tifr.res.in
5. Project Name : GMRT mapping of eight episodic radio source candidates
6. Project Code : 42_067
7. Operator(s) : Deepak, Shilpa, Surender
8. Command File : /data1/gtac/cmd/42_067/42_067_16Jul2022_0600_cmd.py
9. LTA File : /gsbifrdata1/16jul/42_067_16jul2022_gsb.lta, /gwbifrdata2/16jul/42_067_16jul2022_gwb.lta
10. LogFlag File :

4. Observation 17-07-2022

M Gmail

Biju koonammakkil george <kgbiju42@gmail.com>

GTAC Obs Log : 14394
1 message

gtaclog@gmrt.ncra.tifr.res.in <gtaclog@gmrt.ncra.tifr.res.in>
To: ishwar@ncra.tifr.res.in, drjoephysics@gmail.com, kgbiju42@gmail.com, rajapama45@gmail.com

Sun, Jul 17, 2022 at 6:14 PM

GTAC Observation Log

1. Date : 17/07/2022
2. Observation Sr. No. : 14394
3. Observer : Aparna Raj, BIJU.K.G, Joe Jacob, C.H. IshwaraChandra
4. Observer's Email : rajapama45@gmail.com, kgbiju42@gmail.com, drjoephysics@gmail.com, ishwar@ncra.tifr.res.in
5. Project Name : GMRT mapping of eight episodic radio source candidates
6. Project Code : 42_067
7. Operator(s) : Nilesh
8. Command File : /data1/gtac/cmd/42_067/42_067_17Jul2022_1600_cmd.py
9. LTA File : /gsbifrdata/17jul/42_067_17jul2022_gsb.lta, /gwbifrdata/17jul/42_067_17jul2022_gwb.lta
10. LogFlag File :

ANTENNA SETTINGS :

11. RF Band(MHz) & Solar Attn(dB)- RF1 : 306 MHz ,RF2 : 306 MHz, SA1 : 0 dB, SA2 : 0 dB
12. Ist LO (MHz) & IVth LO (MHz): ILO1 : 255 MHz, ILO2 : 255MHz , IVLO1 : 51 MHz, IVLO2 : 51 MHz
13. IF Attn(dB) , IF BW(MHz) & IF ALC : IF-CH1 : 4+14 dB, 32 MHz,ON, IF-CH2 : 4+14 dB, 32 MHz,ON

5. Observation on 18-07-2022

M Gmail

Biju koonammakkil george <kgbiju42@gmail.com>

GTAC Obs Log : 14396
1 message

gtaclog@gmrt.ncra.tifr.res.in <gtaclog@gmrt.ncra.tifr.res.in>
To: ishwar@ncra.tifr.res.in, drjoephysics@gmail.com, kgbiju42@gmail.com, rajapama45@gmail.com

Mon, Jul 18, 2022 at 6:01 AM

GTAC Observation Log

1. Date : 18/07/2022
2. Observation Sr. No. : 14396
3. Observer : Aparna Raj, BIJU.K.G, Joe Jacob, C.H. IshwaraChandra
4. Observer's Email : rajapama45@gmail.com, kgbiju42@gmail.com, drjoephysics@gmail.com, ishwar@ncra.tifr.res.in
5. Project Name : GMRT mapping of eight episodic radio source candidates
6. Project Code : 42_067
7. Operator(s) : Surender
8. Command File : /data1/gtac/cmd/42_067/42_067_18Jul2022_0400_cmd.py
9. LTA File : /gsbifrdata1/18jul/42_067_18jul2022_gsb.lta, /gwbifrdata/18jul/42_067_18jul2022_gwb.lta
10. LogFlag File :

ANTENNA SETTINGS :

11. RF Band(MHz) & Solar Attn(dB)- RF1 : 306 MHz ,RF2 : 306 MHz, SA1 : 0 dB, SA2 : 0 dB
12. Ist LO (MHz) & IVth LO (MHz): ILO1 : 255 MHz, ILO2 : 255MHz , IVLO1 : 51 MHz, IVLO2 : 51 MHz
13. IF Attn(dB) , IF BW(MHz) & IF ALC : IF-CH1 : 4+14 dB, 32 MHz,ON, IF-CH2 : 4+14 dB, 32 MHz,ON

6.   Observation on 22-07-2022

M Gmail   Biju koonammakkil george <kgbiju42@gmail.com>

GTAC Obs Log : 14409
1 message

gtaclog@gmrt.ncra.tifr.res.in <gtaclog@gmrt.ncra.tifr.res.in>   Fri, Jul 22, 2022 at 6:00 AM
To: ishwar@ncra.tifr.res.in, drjoephysics@gmail.com, kgbiju42@gmail.com, rajaparna45@gmail.com

             GTAC Observation Log

    1. Date : 22/07/2022
    2. Observation Sr. No. : 14409
    3. Observer : Aparna Raj, BIJU.K.G, Joe Jacob, C.H. IshwaraChandra
    4. Observer\'s Email : rajaparna45@gmail.com, kgbiju42@gmail.com, drjoephysics@gmail.com, ishwar@ncra.tifr.res.in
    5. Project Name : GMRT mapping of eight episodic radio source candidates
    6. Project Code : 42_067   mailto:drjoephysics@gmail.com
    7. Operator(s) : Rupsing
    8. Command File : /data1/gtac/cmd/42_067/42_067_22Jul2022_0200_cmd.py
    9. LTA File : /gsbifrdata1/22jul/42_067_22jul2022_gsb.lta, /gwbifrdata1/22jul/42_067_22jul2022_gwb.lta
    10. LogFlag File :

    ANTENNA SETTINGS :

    11. RF Band(MHz) & Solar Attn(dB)- RF1 : 591 MHz ,RF2 : 591 MHz, SA1 : 0 dB, SA2 : 0 dB
    12. Ist LO (MHz) & IVth LO (MHz): ILO1 : 540 MHz, ILO2 : 540MHz , IVLO1 : 51 MHz, IVLO2 : 51 MHz
    13. IF Attn(dB) , IF BW(MHz) & IF ALC : IF-CH1 : 4+12 dB, 32 MHz,ON, IF-CH2 : 4+12 dB, 32 MHz,ON

    GSB SETTINGS :

7.   Observation on 04-08-2022

M Gmail   Biju koonammakkil george <kgbiju42@gmail.com>

GTAC Obs Log : 14460
1 message

gtaclog@gmrt.ncra.tifr.res.in <gtaclog@gmrt.ncra.tifr.res.in>   Thu, Aug 4, 2022 at 8:20 PM
To: ishwar@ncra.tifr.res.in, drjoephysics@gmail.com, kgbiju42@gmail.com, rajaparna45@gmail.com

             GTAC Observation Log

    1. Date : 04/08/2022
    2. Observation Sr. No. : 14460
    3. Observer : Aparna Raj, BIJU.K.G, Joe Jacob, C.H. IshwaraChandra
    4. Observer\'s Email : rajaparna45@gmail.com, kgbiju42@gmail.com, drjoephysics@gmail.com, ishwar@ncra.tifr.res.in
    5. Project Name : GMRT mapping of eight episodic radio source candidates
    6. Project Code : 42_067
    7. Operator(s) : Deepak, Nilesh, Rupsing
    8. Command File : /data1/gtac/cmd/42_067/42_067_04Aug2022_1800_cmd.py
    9. LTA File : /gsbifrdata1/04aug/42_067_04aug2022_gsb.lta, /gwbifrdata/04aug/42_067_04aug2022_gwb.lta
    10. LogFlag File :

8.   Observation on 04-08-2022

M Gmail   Biju koonammakkil george <kgbiju42@gmail.com>

GTAC Obs Log : 14461
1 message

gtaclog@gmrt.ncra.tifr.res.in <gtaclog@gmrt.ncra.tifr.res.in>   Thu, Aug 4, 2022 at 10:02 PM
To: ishwar@ncra.tifr.res.in, drjoephysics@gmail.com, kgbiju42@gmail.com, rajaparna45@gmail.com

             GTAC Observation Log

    1. Date : 04/08/2022
    2. Observation Sr. No. : 14461
    3. Observer : Aparna Raj, BIJU.K.G, Joe Jacob, C.H. IshwaraChandra
    4. Observer\'s Email : rajaparna45@gmail.com, kgbiju42@gmail.com, drjoephysics@gmail.com, ishwar@ncra.tifr.res.in
    5. Project Name : GMRT mapping of eight episodic radio source candidates
    6. Project Code : 42_067
    7. Operator(s) : Deepak, Nilesh, Rupsing
    8. Command File : /data1/gtac/cmd/42_067/42_067_04Aug2022_2000_cmd.py
    9. LTA File : /gsbifrdata1/04aug/42_067_04aug2022_gsb.lta.1, /gwbifrdata/04aug/42_067_04aug2022_gwb.lta.1
    10. LogFlag File :