

Enclosure 3

Activities of the ICRANet Isfahan and Mazandaran Iran Seats

ICRANet-ISFAHAN Annual Report 2022

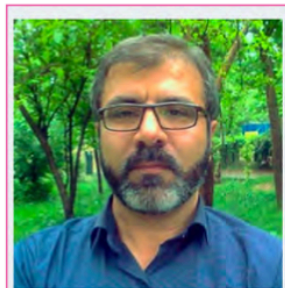


Jan 2023

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ICRANet-ISFAHAN Members



Moslem Zarei

Gravity and Cosmology
Faculty, Associate
Professor



**Davood Rafiei
Karkevandi**

**Astrophysics
Part Time Researcher**





History of ICRANet at a Glance



ICRANet, the International Center for Relativistic Astrophysics Network, is an international organization promoting research activities in relativistic astrophysics and related areas. ICRANet was founded in 1985 by renowned Italian physicist Remo Ruffini, Professor Riccardo Giacconi (winner of the Nobel Prize for Physics in 2002), Professor Abdul Salam (winner of the Nobel Prize for Physics in 1979), Professor Paul Boynton (professor at George Washington University), and several other leading physicists. Professor Remo Ruffini has been the director of this research institute since 2005.

ICRANet Seats and Centers

ICRANet members are four countries and three Universities and Research Centers. The members are the Republic of Armenia, the Federative Republic of Brazil, the Italian Republic, the Vatican State, the University of Arizona (USA), Stanford University (USA), and ICRA. The headquarters is located in Pescara, Italy. ICRANet has signed collaboration agreements with over 60 institutions, universities, and research centers in different countries. One of the chief responsibilities of ICRANet is to help the growth and development of international activities in the field of relativistic astrophysics and other fields related to physics in different countries. Currently, ICRANet has several operative centers such as:

-  ICRANet headquarters in Pescara, The Physics' Department of University "La Sapienza" in Rome, (Italy)
-  The Presidium of the Armenian National Academy of Sciences (Yerevan, Armenia)
-  Isfahan University of Technology (Isfahan, Iran)
-  National Academy of Sciences of Belarus (Minsk, Belarus)



Map of the Institutions worldwide which signed an agreement with ICRANet, with the corresponding exchanges of professors, researchers and post-docs, as well as with the joint meetings organized.

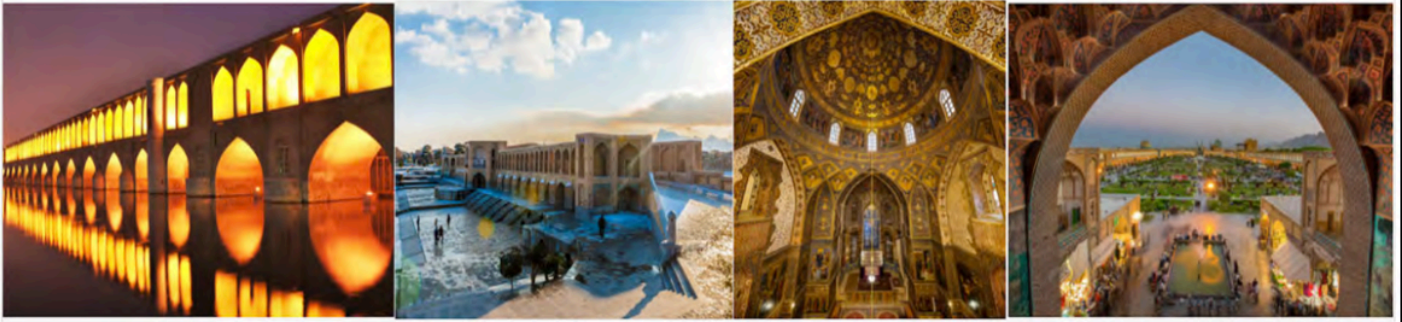
ICRANet-IRAN Collaboration

Some leading Universities and Institutes in Iran are now collaborating with ICRANet, and some additional ones have requested to collaborate, the ones with signed collaboration agreement are:

- [Alzahra University](#)
- [Institute for Advanced Studies in Basic Sciences \(IASBS\)](#)
- [Institute for Research in Fundamental Sciences \(IPM\)](#)
- **[Isfahan University of Technology \(IUT\)](#)**
- [Sharif University of Technology \(SUT\)](#)
- [Shiraz University \(SU\)](#)
- [University of Mazandaran \(UMZ\)](#)
- [Damghan University \(DU\)](#)



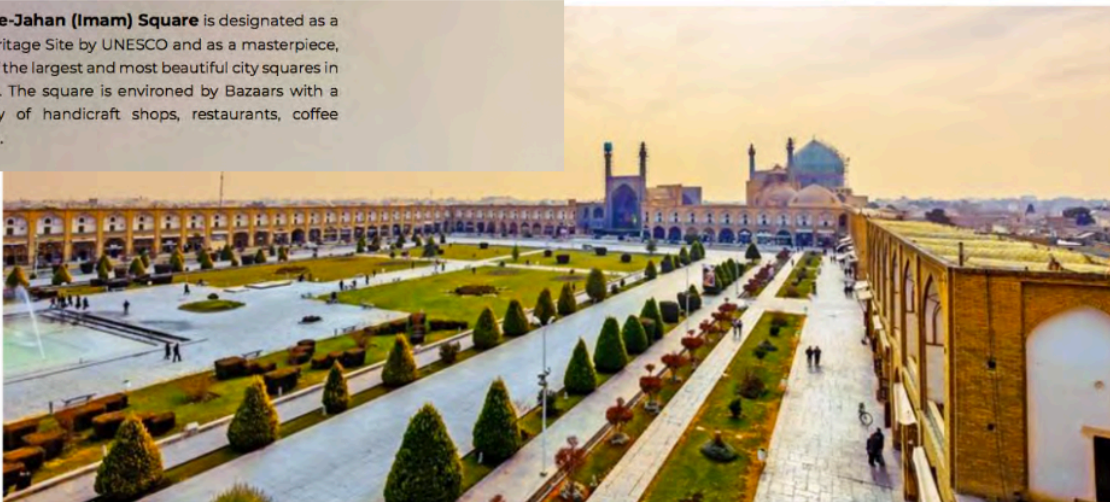
ISFAHAN



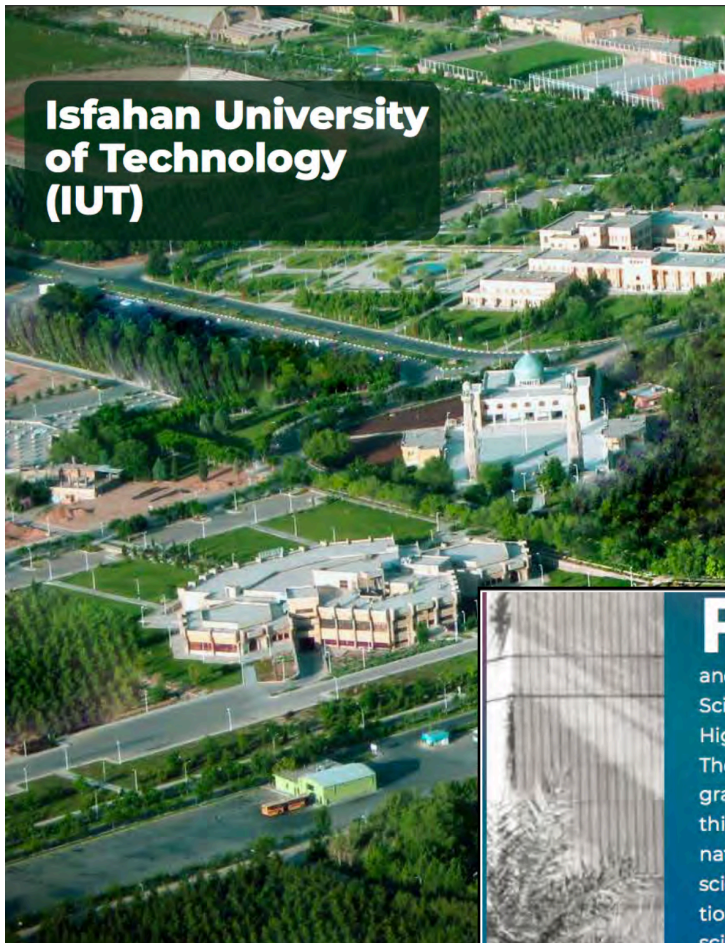
Isfahan, a major city in central Iran, was the splendid capital of the Seljuq and Safavid dynasties whose legacies established Iran (formerly Persia) as the cultural heart of the eastern Islamic world in terms of language (Persian), art, and architecture. The Safavid period (1501-1736) was particularly decisive for shaping the city, whose beauty was so great that world travelers purportedly dubbed it "Half the World". Nowadays Isfahan is considered as one of the most important scientific, Industrial and cultural centers of Iran.



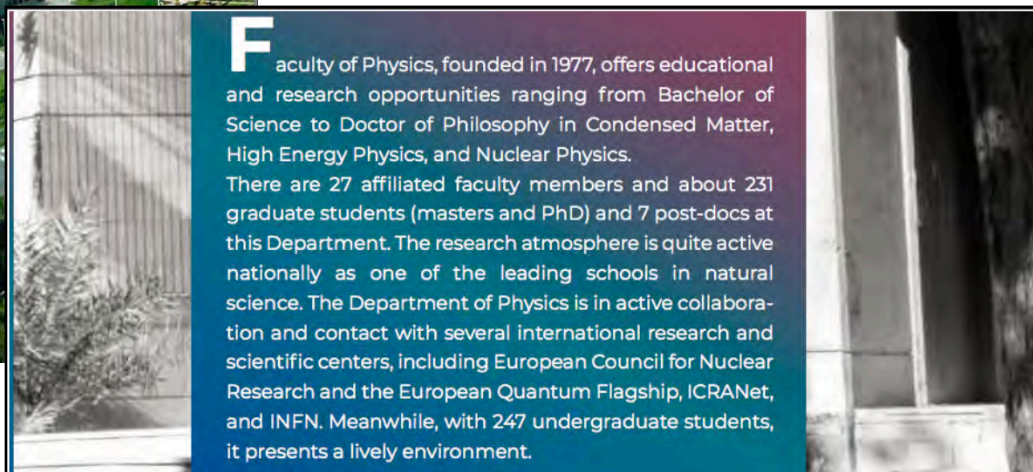
Naghsh-e-Jahan (Imam) Square is designated as a World Heritage Site by UNESCO and as a masterpiece, it is one of the largest and most beautiful city squares in the world. The square is enviroined by Bazaars with a miscellany of handicraft shops, restaurants, coffee shops, etc.



Naqsh-e Jahan Square(Imam Square)-Isfahan-IRAN



Isfahan University of Technology (IUT)



Faculty of Physics, founded in 1977, offers educational and research opportunities ranging from Bachelor of Science to Doctor of Philosophy in Condensed Matter, High Energy Physics, and Nuclear Physics. There are 27 affiliated faculty members and about 231 graduate students (masters and PhD) and 7 post-docs at this Department. The research atmosphere is quite active nationally as one of the leading schools in natural science. The Department of Physics is in active collaboration and contact with several international research and scientific centers, including European Council for Nuclear Research and the European Quantum Flagship, ICRANet, and INFN. Meanwhile, with 247 undergraduate students, it presents a lively environment.



The Department of Physics of Isfahan University of Technology (IUT) as Host of ICRANet-Isfahan Shines in Shanghai Subject Rankings 2021

According to the ranking group for universities and research institutes of the Islamic World Science Citation (ISC), in the field of **Physics**, IUT is ranked among the top 500 universities worldwide in Shanghai 2021 Ranking System and the top department of physics among the universities of Iranian Ministry of Science, Research and Technology.

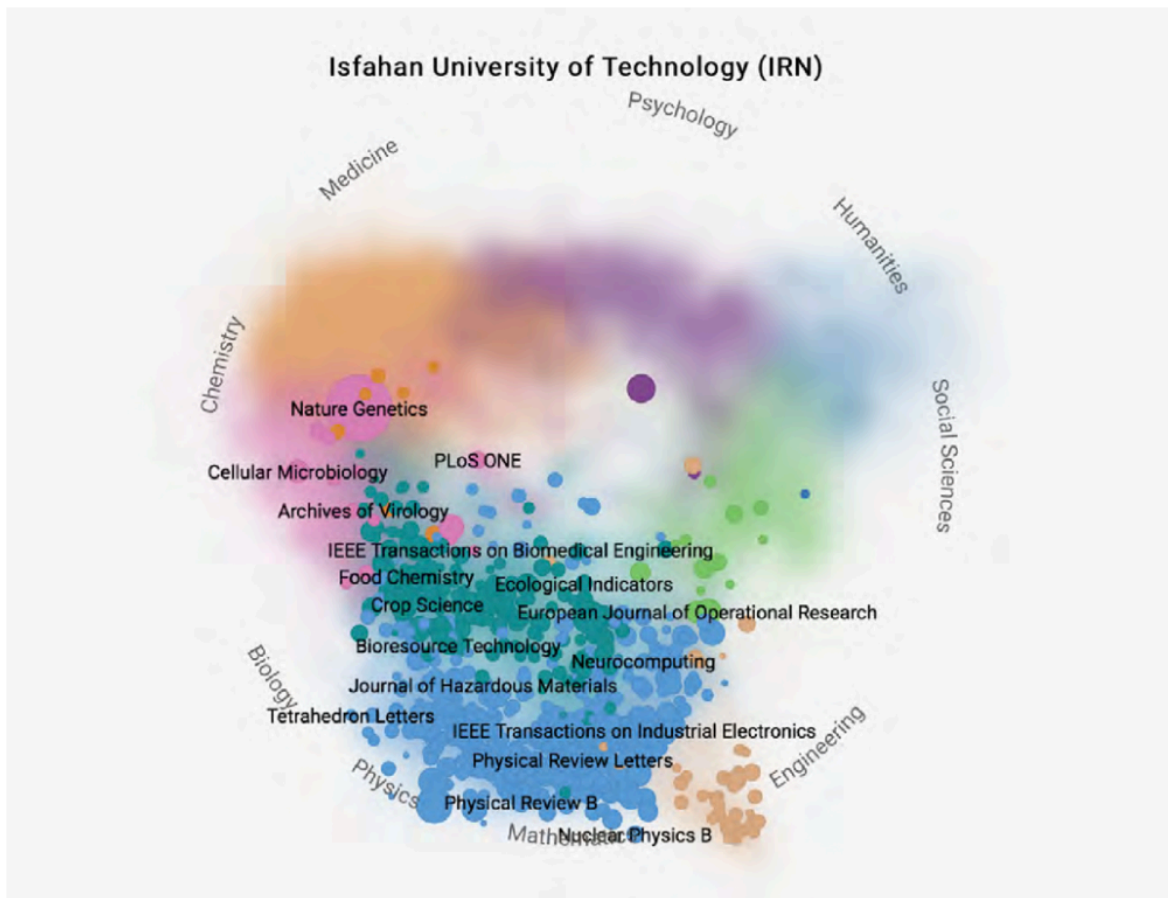
Shanghai Ranking is one of the best-known and most influential global ranking of universities began to publish world university ranking by academic subjects in 2009. The subject rankings of the world's top universities in Shanghai Ranking System published recently for the 5th year in 2021 where 35 universities from Iran have participated in this ranking. More than 1,800 out of 4,000 universities across 93 countries and regions are finally listed in the ranking.

Islamic World Science Citation Center - ISC

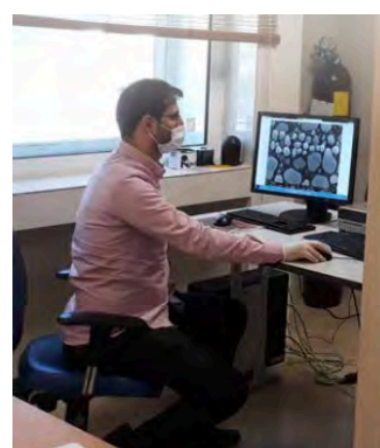
<https://www.shanghairanking.com/institution/isfahan-university-of-technology>

According to SCIMAGO Institutions Ranking, Isfahan University of Technology in the field of physics and astrophysics is at the rank of 208th among world universities and 8th in Middle East

<https://www.scimagoir.com>



[A Laboratory at Steel Research Center]





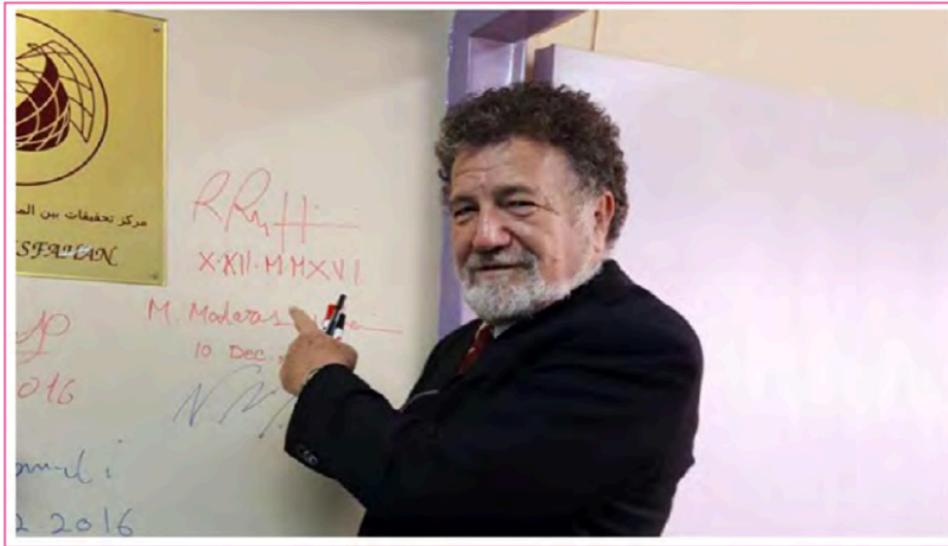
ICRANet–Isfahan Overview

Isfahan University of Technology (IUT), as one of the leading universities in Iran, is founded in 1974 and started its academic activities in 1977. IUT is one of the pioneers among the National universities and has been ranked among the top Asian Universities in the International University Rankings. IUT has 14 faculties and departments with about 11000 students and 600 academic members and offers four disciplines of engineering, basic sciences, agriculture, and Natural resources in all three study levels of BSc, MSc, and PhD.

ICRANet-ISFAHAN



Prof. Remo Ruffini, director of the International Center for Relativistic Astrophysics Network (ICRANet), Italy, and Dr. Narek Sahakian, the director of ICRANet-Armenia center, visited IUT on December 20 and 21, 2016. Following this meeting, the ICRANet Office in Isfahan University of Technology (IUT) has been inaugurated by Prof. Ruffini and Prof. Modarresh Hashemi, the then president of IUT, during a formal opening ceremony. The main purposes of establishment of this office that is located at the Department of Physics of IUT are developing research activities in relativistic astrophysics, organizing workshops and schools, exchanging researchers, faculty members, and graduate students. The establishment of this office is following the past scientific collaboration between IUT researchers and students with ICRANet.



Prof. Remo Ruffini, Director of ICRANet, visited different centers and institutes in Iran: the Isfahan University of Technology on December 10 and 11, 2016, the Institute for Advanced Studies in Basic Sciences (Zanjan) and the Shahid Beheshti University.

Following IUT meeting, the ICRANet Office in the IUT has been inaugurated by Prof. Ruffini and Prof. Modarresh Hashemi during a formal opening ceremony. This center has been launched in order to develop research activities in relativistic astrophysics, organizing workshops and schools, exchanging of researchers, faculty members and graduate student



Signing the wall of ICRANet center in IUT by Dr. Narek Sahakyan, Prof. Parviz Kameli and Prof. Ruffini

Prof Remo Ruffini had a meeting with Mahmoud Modarres-Hashemi during his visit at IUT in December 10, 2016 and they discussed about:

- 1- An active collaboration, developing the participation of IUT to IRAP PhD program of ICRANet as a joint PhD program between IUT-ICRANet under financial support of IRAN-ITALY governments.
- 2- They have in particular agreed that the visit to ICRANet by students and Postdoc in both sides, for the longer period of one year in order to promote a more effective collaboration. IUT look forward to host at least two postdocs per year, one Iranian and one from ICRANet;
- 3- They look forward to an active collaboration and fostering of the ICRANet center in IUT in close contacts with ICRANet Centers in Pescara (headquarters), Rome, Nice, Rio de Janeiro and Yerevan;
- 4- Exchanging of researchers, faculty members and graduate students between Iran-Italy.
- 5- Develop research activities in relativistic astrophysics, organizing workshops and schools.



From left to right: Dr. Narek Sahakyan (Director of the ICRANet seat in Yerevan), Prof. Remo Ruffini (ICRANet Director), Prof. Mahmood Modarres-Hashemi (President of IUT), Prof. Mahboobi Sofiani (Director of International & Scientific Cooperation Office of IUT), Dr. Moslem Zarei (Deputy of Research of IUT physics Department and Prof Parviz Kameli (Head of IUT physics department).



From left to right: Dr. Narek Sahakyan (Director of the ICRANet seat in Yerevan), Prof. Remo Ruffini (ICRANet Director) Prof. Mahmood Modarres-Hashemi (President of IUT), Prof Parviz Kameli (Head of IUT physics department

Agreement ICRANet - IUT



COOPERATION PROTOCOL

between the

**INTERNATIONAL CENTER FOR RELATIVISTIC ASTROPHYSICS NETWORK
(ICRANet)**

and the

**ISFAHAN UNIVERSITY OF TECHNOLOGY
(IUT)**

The ICRANet, represented by its Director, Prof. Remo Ruffini, and the Isfahan University of Technology, represented by its President, Mahmoud Modarres-Hashemi,

agree

to establish this Cooperation Protocol which is governed by the following clauses:

FIRST:

The main objectives of this Cooperation Protocol are to promote the development and dissemination of scientific and technological research in the fields of cosmology, gravitation and relativistic astrophysics between ICRANet and several institutions under the coordination of the Isfahan University of Technology.

Henceforth we will refer in this document to ICRANet – IUT to designate the institutions which participate in this present Cooperation Protocol.

SECOND:

The activities to be undertaken under this Cooperation Protocol will consist of joint actions involving one or more of the following items:

I – The institutional exchange of graduate or post-graduate students, researchers and faculty members of ICRANet and IUT;

II – The development of teaching and/or research activities related to the areas of expertise and interest of ICRANet and IUT;

III – The organization of symposia, seminars, conferences and short courses on topics and areas of expertise and interest of ICRANet and IUT;

IV – The promotion and support of technical-scientific and cultural events and activities open to the public;

V – The development of opportunities to form university teachers and researchers, by means of specialized advanced high-level courses in areas of interest and expertise of ICRANet and IUT;

VI –The organization of training and recycling courses and activities as well as the developing of inter-institutional research areas associated to local graduate programs;

VII –The promotion of joint publications;

VIII – Implementation of socially oriented activities through the academic extension;

IX – Exchange of information concerning teaching and research activities in both institutions signatory of this Cooperation Protocol.

THIRD:

The implementation of the activities envisaged by the contracting parties will be specified by means of Work Plans relative to this Cooperation Protocol, to be signed by the contracting parties at the time of definition of common projects, areas of research and education, or any other activities of mutual interest.

FOURTH:

The institutions signatories of this Cooperation Protocol shall adopt, as a general principle, and to the extent of their budgetary possibilities, the financing of academic actions carried out by this instrument. In the specific case of exchange of professional between the signatory institutions, the visiting institution shall endeavor efforts to cover transportation expenses of their students, professors and technicians while the hosting institution may cover their living expenses. To finance such expenses, participants must apply to granting agencies and other national or international institutions.

Students, professors, researchers and administrative staff taking part in exchange activities must have health insurance valid during those activities paid by the visiting part.

FIFTH:

When activities originating from this instrument of cooperation result in products, improvements or innovations, subject to rights, both parties will establish - according to the law and to proper regulatory legislation, by means of specific instruments and proportionally to the contribution of each institution - the conditions that will regulate property rights.

SIXTH:

The activities developed within the scope of this Cooperation Protocol will be carried by members of both parties, appointed by each institution, according to the nature of the activities in each project, the parties being allowed to rely upon the support of external organizations.

An overall coordinator will be appointed for each of the signing Institutions in order to monitor and supervise the implementation and progress of programs and projects related to the present Cooperation Protocol and to establish plans for the future of this cooperation.

The coordinators will meet at least once a year or by electronic means (such as e-conference), or through visits to partner institutions.

SEVENTH:

This present instrument will be valid for 5 (five) years, starting from the date of its signature. It will be extended automatically for another 5 (five) years through an exchange of letters between the signatories.

EIGHTH:

This present Cooperation Protocol may be canceled by either of the parties, by means of a notification at least 60 (sixty) days in advance – which may be waived if both parties come to a consensual agreement – being advisable, however, to attempt to ensure that ongoing activities are maintained.

NINTH:

Any necessary modification to the present Cooperation Protocol must be stated in Additional Terms that will be negotiated between the parties, without prejudice to ongoing activities.

In particular this instrument of cooperation could be extended to other partnerships, through the express agreement of the parties through an Additional Term.

TENTH:

For purposes of this Cooperation Protocol the parties establish their addresses as:
ICRANet: ICRANet Coordinating Center: Piazza della Repubblica, 10, 65122 Pescara, Italy;

IUT: Isfahan, Khomeyni Shahr, Daneshgah e Sanati HW, Iran;

through which the correspondence held between with respect to the interpretation and enforcement of this Cooperation Protocol should be formalized.

All terms having been agreed upon, the representatives of the parties signed the present instrument, in 4 (four) copies of the same document, two in Iranian and two in English, with equal content to ensure legal effect.

February 21, 2016

M. Modarres Hash
PROF. MAHMOUD MODARRES-HASHEMI
President of Isfahan University of
Technology

Remo Ruffini
PROF. DR. REMO RUFFINI
Director of ICRANet



Renewal Agreement ICRANet - IUT

Due to the fruitful bilateral collaboration between IUT and the International Center for Relativistic Astrophysics Network - ICRANet, a protocol of cooperation that was signed in 2016 has been extended to five more years in Feb 2021. Also, some programs namely Dual Degree Ph.D. programs, Joint research under EU program for 2021-2027, Joint Mobility program under Erasmus+ program, Exchanging Academic members and Ph.D. students for using their sabbatical leaves and choosing adjunct professorship, and organizing joint webinars and online workshops in mutual fields of interest, have been added to the agreement.

The ICRANet office in the IUT was inaugurated by Prof. Remo Ruffini, the Director of ICRANet, International Centre for Relativistic Astrophysics Network, together with the IUT former President, during a formal opening ceremony in 2016. The main purposes of establishing this office that is located at the Department of Physics of IUT are developing research activities in relativistic astrophysics, organizing workshops and schools, and exchanging researchers, faculty members, and graduate students. The establishment of this office is followed by the past scientific collaboration between IUT researchers and students with ICRANet.

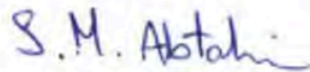
X - The promotion of dual Degree Ph.D. programs;

XI - The collaboration on joint researches under EU programs for the period 2021-2027;

XII - The implementation of joint mobility programs, under the framework of the Erasmus+ program;

XIII - The exchange of Academic members and Ph.D. students for their sabbatical leave and as Adjunct Professors;

XIV - The organization of joint webinars and online workshops, in the mutual fields of interest.



PROF. DR. SAYYED MAADI ABTAHI

President of Isfahan University of
Technology



PROF. DR. REMO RUFFINI

Director of ICRANet



IUT- ICRANet Collaboration

The IUT-ICRANet collaboration started from 2010, with more than 8 PhD students who went to ICRANet for short and long visit periods, jointly supported by ICRANet and by the Ministry of Science, Research and Technology of the Islamic Republic of Iran. There have been several joint activities between ICRANet and IUT including joint webinars on different astrophysical occasions. IUT and ICRANet members have made remarkable contributions to the field of relativistic astrophysics with various publications in highly ranked scientific journals in past years.



Saghar Batebi

19 of November
2014 to 19 of
May 2015



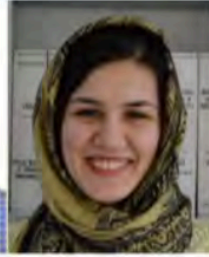
**Rohollah
Mohammadi**

3 of March to
August 2010



**Ehsan
Bavarsad**

9 of February
to 9 of March
2011



**Seddigheh
Tizchang**

19 of November
2014 to 19 of May
2015



Rashid Riahi

24 of August
2016 to
8 of February
2017



Iman Motie

1 of October 2010
to 28 of February
2011



From left to right: She-Sheng Xue, Wang Yu, Remo Ruffini, Rahim Moradi, Soroush Shakeri and Razie Pakravan



ICRANet

International Center for Relativistic Astrophysics Network

Pescara, 28/04/2021

Prot. 4170

H. E. Minister Mansour Gholami
Minister of Science, Research and Technology
Hormozan and Southern Piroozan Crossroads,
Khovardin St. Sana't Square, 14666_64891 – Tehran
Islamic Republic of Iran
cisc@msrt.ir

CC: H. E. Amb. Giuseppe Perrone
segreteria.teheran@esteri.it

CC: ICRANet Steering Committee
icranet_board_members@icra.it

Your Excellency,

I follow on my recent letter with the proposal of having the Islamic Republic of Iran to enter ICRANet. Since many decades, I have been collaborating in Relativistic Astrophysics with Iran and Asian countries: I have been impressed by the historical cultural roots of your scientists. China, with the "guest stars", and Iran with the Ulugh Beg map of the "fixed stars", have been the first countries, centuries ago, to extend the knowledge of our Universe outside our planetary system. The concept of *Algebra* was invented by Al-Khwarizmi and all the World has been studying for centuries his textbooks. On my desk, I keep a precious copy of a book of Umar Khayyām, offered to me by Prof. Yousef Sobouti, during my recent visit to Zanjan. There Khayyām, starting from mathematic, has raised to express the most profound poetry expression of the human soul.

Some leading Universities and Institutes in Iran are now collaborating with ICRANet, and some additional ones have requested to collaborate, the ones with signed collaboration agreement are:

- Alzahra University - <http://www.icranet.org/alzahra>
- Institute for Advanced Studies in Basic Sciences (IASBS) - <http://www.icranet.org/iasbs>
- Institute for Research in Fundamental Sciences (IPM) - <http://www.icranet.org/ipm>
- Isfahan University of Technology (IUT) - <http://www.icranet.org/iut>
- Sharif University of Technology (SUT) - <http://www.icranet.org/sharif>
- Shiraz University - <http://www.icranet.org/shiraz>
- University of Mazandaran - <http://www.icranet.org/mazandaran>

It is precisely collaborating with the scientists in these Institutions, well aware of their glorious past, that we are now unveiling the "formulae" of the new physical process which explain the occurrence of this extreme cosmic process in Gamma-Ray Bursts (GRBs) and Active Galactic Nuclei (AGNs), hundred billions of billions times brighter than our Sun.

On the occasion of the Sixteenth Marcel Grossmann meeting (MG16), which will take place remotely worldwide from July 5, 2021 to July 9, 2021, we are going to hold in Iran, Pakistan and Uzbekistan, a series of lectures on Ulugh Beg. I am happy to confirm that we have waived the 250 € registration fee for the participants from the 7 above Universities and Institutes. I sincerely hope that, by the time of MG16, our project will have evolved and allow the participation of an ever growing number of Iranian scientists.

I take this occasion to send to you, Your Excellency Mansour Gholami, my warm personal regards.

Prof. Remo Ruffini
Director of ICRANet

Piazza della Repubblica, 10 - 65122 Pescara - Italy - Phone +39.085.23054.200 - Fax +39.085.4219252
director@icranet.org - secretariat@icranet.org - www.icranet.org - C.F.: 91080720682



Isfahan University of Technology

Office of President

Isfahan 84156 IRAN Tel : +98-311-3913100-1 Fax : +98-311-3913112 E-Mail : president@cc.iut.ac.ir

May 8, 2021

Prof. Remo Ruffini
Director of ICRANet
ruffini@icra.it

Dear Professor Remo Ruffini,

Thank you so much for your correspondence with H.E. Dr. Gholami, the Iranian Minister of Science, and H.E. Giuseppe Perrone, the Ambassador of Italy in Tehran. I appreciate your time and effort spent on supporting the initiative on accepting the Islamic Republic of Iran as a Member State joining ICRANet.

Since a regional office of ICRANet has been established at IUT, we would like to eagerly expand our relationships and interactions with that institute which is a prestigious center for international researchers and students worldwide.

My colleagues at the Department of Physics, including Dr. Soroush Shakeri, and I at IUT will pursue the matter to organize a meeting with H.E. Dr. Gholami, the Iranian Minister of Science, and H.E. Giuseppe Perrone, the Ambassador of Italy in Tehran.

Thank you again for supporting Isfahan University of Technology as the leading Iranian institute to be the Center of ICRANet IRAN in joining I.R. IRAN to ICRANet as a Member State, and I am looking forward to having more cooperation in the future.

Yours sincerely,

Prof. Dr. S. M. Abtahi
President
Isfahan University of Technology
Isfahan 84156, IRAN





ICRANet

International Center for Relativistic Astrophysics Network

Pescara, 28/04/2021

Prot. 4158

S. E. Amb. Giuseppe Perrone
Ambasciatore d'Italia a Teheran
Avenue Neauphle Le Chateau, 66-68
Teheran – Repubblica islamica dell'Iran
segreteria.teheran@esteri.it

CC: Cons. Amb. Enrico Padula
Ministero degli Affari Esteri e della Cooperazione Internazionale
enrico.padula@esteri.it

Cc Prof.ssa Immacolata Pannone
Ministero degli Affari Esteri e della Cooperazione Internazionale
immacolata.pannone@esteri.it

Spazio Ambasciatore

sono particolarmente lieto di rivolgermi a Lei per segnalarLe che oggi riceverà copia di un invito da me inviato a S.E. Mansour Gholami, Ministro della Scienza, della Ricerca e della Tecnologia della Repubblica islamica dell'Iran, affinché l'Iran possa entrare nell'ICRANet come Stato membro. Questo passo è ben rilevante sia per l'Iran, che per l'Italia ed anche per promuovere l'inserimento della Repubblica islamica dell'Iran nella comunità scientifica internazionale operante nell'Astrofisica Relativistica.

Ho avuto da decenni contatti con scienziati Iranian, inclusi i rapporti scientifici con eminenti scienziati, quali il Prof. Yousef Sobouti, fondatore di quel gioiello che è il centro di ricerca IASBS a Zanjan. Inoltre, l'ICRANet ha ospitato giovani ricercatori e studenti iraniani nella sua sede centrale a Pescara, ed ha già firmato 7 accordi di collaborazione con le maggiori Università iraniane. Questo ha portato a molteplici pubblicazioni sulle più qualificate riviste scientifiche a livello internazionale. Questi impegni di ricerca stanno creando una nuova classe di giovani ricercatori, fortemente motivati alla ricerca scientifica nella più profonda tradizione culturale e scientifica dell'Iran.

Particolarmente significativa è l'attività svolta presso l'Università di Isfahan, dove un centro ICRANet è in grande sviluppo e si stanno aprendo i contatti non solo verso l'ICRANet, ma anche verso il CERN di Ginevra. È proprio in queste attività che l'ICRANet intende avere un ruolo fondamentale nel collaborare con i giovani ricercatori, aprendoli a quei contatti internazionali essenziali per lo sviluppo scientifico e tecnologico, ed indirizzandoli verso uno stile di ricerca fondamentale e pacifico che ha sempre caratterizzato l'Italia. In questo senso, ho indicato la frase "create a new technological, cultural and scientific golden age". Lo stesso impegno caratterizza le attività promosse dall'ICRANet nei paesi limitrofi: in Armenia con la sede ICRANet a Yerevan, in Uzbekistan, in Kazakistan, in Pakistan ed in Cina con il prestigioso dottorato di ricerca internazionale in Astrofisica Relativistica, iniziato dall'ICRANet con l'Università di Scienza e Tecnologia della Cina (USTC) e con l'Università di Ferrara.

Colgo l'occasione per inviarLe, Ambasciatore Perrone, i miei saluti più cordiali ed esprimerLe fin da ora, anche a nome di tutti i membri dell'ICRANet, la nostra profonda gratitudine per quanto vorrà fare in supporto di questa iniziativa.

su

Prof. Remo Ruffini
Direttore ICRANet

Piazza della Repubblica, 10 - 65122 Pescara - Italy - Phone +39.085.23054.200 - Fax +39.085.4219252
director@icranet.org - secretariat@icranet.org - www.icranet.org - C.F.: 91080720682

ICRANet - ISFAHAN Astronomy Meeting

In collaboration with ICRANet-Italy, ICRANet-ISFAHAN at IUT organized the First Series of online ICRANet-Isfahan Astronomy Meeting from November 3 to November 5, 2021.

IUT virtually hosted more than 33 prominent invited speakers from more than 16 countries, among whom were **Roy Patrick Kerr** (Discoverer of the Solution to the Rotating Black Hole in 1963); **Shing-Tang Yau** (Winner of the Mathematical Fields Medal in 1982); **Claus Lammerzahl** (Director of Space Sciences of ZARM, University of Bremen); **Remo Ruffini** (President of ICRANet); **Yousef Sobouti** (Founder of Institute for Advanced Studies in Basic Sciences IASBS); **Habib Khosroshahi** (Head of the Iranian National Observatory) and many other eminent scholars. There were more than 190 registered participants and attendees.

This meeting was inaugurated with the honorary support and a message from the Minister of Science, Research and Technology of the Islamic Republic of Iran, H.E. **Mohammad Ali Zolfi Gol**. He gave a very warm welcome to all the participants, highlighting his strong support to this significant event which marked the continuation of a longstanding, active and fruitful collaboration between ICRANet and IUT and, more generally, between Italy and Iran. The speech of the Minister has been presented to the participants by Prof. **Yousef Sobouti**.

This meeting provided a great opportunity for discussing about topics ranging from the ancient Persian astronomy to recent developments in observational astronomy, high energy astrophysical phenomena such as Gamma-Ray Bursts (GRBs) and Active Galactic Nuclei (AGNs), Theories of Gravity, General Relativity and its Mathematical Foundation, Black Holes, Dark matter and Early Universe Cosmology. There was also a workshop on "Data Science and Machine Learning in Relative Astrophysics".



[https:// indico.icranet.org/](https://indico.icranet.org/)

<https://www.youtube.com/watch?v=6nM0WwpawdM&list=PLr5RLbSWSonuzZt0K4CkKjbHuKcYgpSZI>

H.E. MOHAMMAD ALI ZOLFIGOL, MINISTER OF SCIENCE, RESEARCH AND TECHNOLOGY (MSRT), ISLAMIC REPUBLIC OF IRAN



ICRANET-ISFAHAN ASTRONOMY MEETING



ICRANet

3-5 NOVEMBRE 2021 **VIRTUAL MEETING**

FROM THE ANCIENT PERSIAN ASTRONOMY
TO RECENT DEVELOPMENTS
IN THEORETICAL AND EXPERIMENTAL PHYSICS,
ASTROPHYSICS AND GENERAL RELATIVITY

**With a Workshop on Data Science
in Relativistic Astrophysics**



[HTTPS://INDICO.ICRANET.ORG/EVENT/21](https://indico.icranet.org/event/21)

**50TH ANNIVERSARY OF
"INTRODUCING THE BLACK HOLE"**

SCIENTIFIC COMMITTEE
Remo Ruffini (ICRANet-Italy) (Co-Chair)
Yousef Sobouti (ISABE-Iran) (Co-Chair)
Hassan Firoozjahi (IPM, Iran)
Shahram Khoozravi (KNU, Iran)
Habib Khosroshahi (IPM, Iran)
Kourosh Nozari (UMZ, Iran)
Sohrab Rahvar (IUT, Iran)
Sorush Shakori (IUT, Iran)
Shadi Tahvilidar-Zadeh (Rutgers, USA)
She-Siheng Xue, (ICRANet-Italy)

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Amin Farhang, IPM and IUT, Iran
Fazlollah Hajkarim, UNIPD-Italy
Rahim Moradi, ICRANet-Italy
Sedigheh Sajjadian, IUT, Iran
Shahab Shahidi, DU, Iran
Wang Yu, ICRANet, Italy
M. H. Zholidze Haghighi, IPM, KNTU, Iran

INVITED SPEAKERS
S. Abbassi, Ferdowsi Univ., Iran
Y. Alimuratov, Fesenkov Inst., Kazakhstan
L. Amati, INFN-OAS Bologna, Italy
C. Argüelles, Univ. La Plata, Argentina
L. Becerra, PUC, Chile
K. Borshchayev, Al-Farabi Univ., Kazakhstan
P. Carezza, Stockholm Univ., Sweden
M. Della Valle, INFN, Capodimonte Obs., Italy
H. Haghshah, IASBS, Iran
F. Hajkarim, UNIPD, Italy
L. Izzo, Copenhagen Univ., Denmark

R. Kerner, Sorbonne Univ., France
R. P. Kerr, Canterbury Univ., New Zealand
and ICRANet
H. Khosroshahi, IMO, IPM, Iran
C. Lämmerzahl, ZARM, Bremen Univ., Germany
L. Li, ICRANet, Italy
R. Liu, NJU, China
H. M. Mamedani, Inst. of Philosophy, Iran
R. Moradi, ICRANet, Italy
R. Perron, IAP2-INAF, France
J. Rueda, ICRANet, Italy
R. Ruffini, ICRANet, Italy

H. Safari, Zanjan Univ., Iran
N. Sahakyan, ICRANet, Armenia
S. Shakori, IUT, Iran
Y. Sobouti, IASBS, Iran
L. Späthler, Macquarie Univ., Australia
C. Stahl, Strasbourg Univ., France
F. Tabatabaee, IPM, Iran
S. Tahvilidar-Zadeh, Rutgers Univ., USA
Shing-Tung Yau, Harvard, USA
Y. Wang, ICRANet, Italy
M. H. Zholidze Haghighi, IPM and KNTU, Iran



Geographical Dispersion of Participants

The ICRANet-Isfahan Astronomy Meeting was arranged by inviting 33 prominent speakers from 16 different countries including Iran, Italy, Germany, United States of America (USA), United Kingdom (UK), Sweden, Russia, China, France, Armenia, Kazakhstan, New Zealand, Chile, Denmark, Argentina, Australia.

More than 190 participants and attendees registered in the meeting which provided a very active scientific atmosphere with fruitful discussions. There were participants from Iran, Italy, Iraq, India, Bangladesh, Pakistan, Poland, Brazil, South Africa, Germany, USA, UK, Sweden, Russia, Taiwan, France, Armenia, Kazakhstan, Australia.



Concluding Remarks



Prof. Dr. Soroush Shakeri
Faculty Member of Department
of Physics (IUT) &
Director of ICRANet, Isfahan &
Adjunct Professor ICRANet, Italy

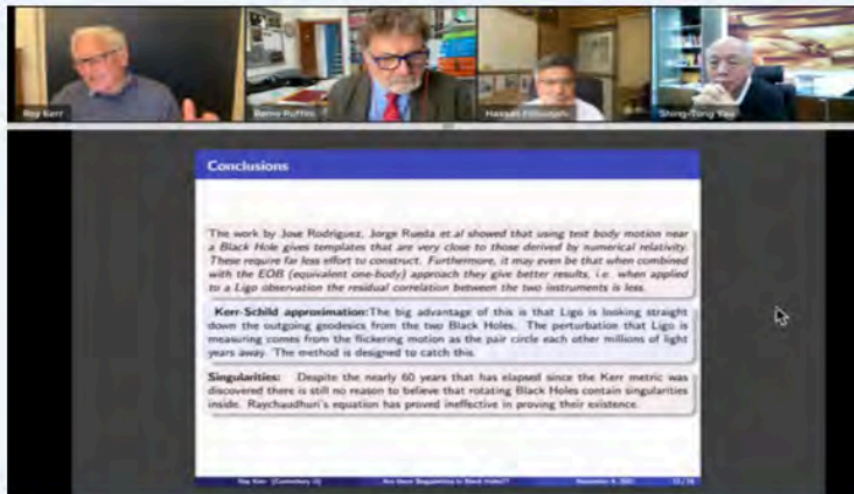
The ICRANet-Isfahan astronomy meeting is along with more than a decade of active collaboration on the field of relativistic astrophysics between ICRANet and the Department of Physics at IUT. This meeting by inviting more than 33 prominent speakers from more than 16 countries served as a great opportunity for discussing topics ranging from the ancient Persian astronomy to recent developments in Theoretical and Experimental Physics, Astrophysics, and General Relativity.

There were more than 190 registered participants and attendees which provided a very active scientific atmosphere with fruitful discussions between participants and speakers. The opening remarks of the meeting have been presented by H.E. Mohammad Ali Zolfigol, Minister of Science, Research and Technology of the Islamic Republic of Iran. This speech has been presented by Prof. Yousef Sobouti, he also gave a talk about the development of modern astronomy in Iranian universities in the morning session. This continued by a presentation from Prof. Remo Ruffini about the 50th anniversary of "Introducing the Black Hole" and his non-stop efforts during past decades to understand the physical nature of Gamma Ray

Bursts (GRBs) as the most luminous explosions in the Universe.

In the following Prof. Habib Khosroshahi presented an extensive overview about the last situation of the Iranian National Observatory (INO) and its 3.4m optical telescope, he also drew our attention to the unique potential of INO to follow the transient sources such as GRBs. We had several talks about the physics of GRBs, and GRBs in the optical domain, GRB - Supernova connection, and using GRBs as a cosmological tool which led to many interactive discussions. The first day of the meeting finished with a presentation by Prof. Shadi Tahvildar-Zadeh about the dream of Einstein to arrive at a quantum theory of atomistic matter that included electrodynamic phenomena.

The Second day of the meeting was started with a presentation by Prof. Roy Patrick Kerr who first discovered the solution of the rotating Black Hole in 1963, he discussed about the nature of singularities and his Kerr metric which was among hot topics in most of the scientific discussions around General Relativity (GR) in the past 50 years. Afterwards, Prof. Shing-Tang Yau who is the winner of the mathematical Fields Medal in 1982 talked about the notion of angular momentum in GR. There were several talks in the morning session about some European missions in astrophysics such as New high precision tests of GR presented by Claus Lammerzahl, Mercury, and the BepiColombo mission presented by Prof. Roberto Peron, and also about Square Kilometre Array (SKA) project presented by Prof. Fatemeh Tabatabaei. This day finished with a workshop on "Data Science and Machine Learning in Relative Astrophysics" in the afternoon session.

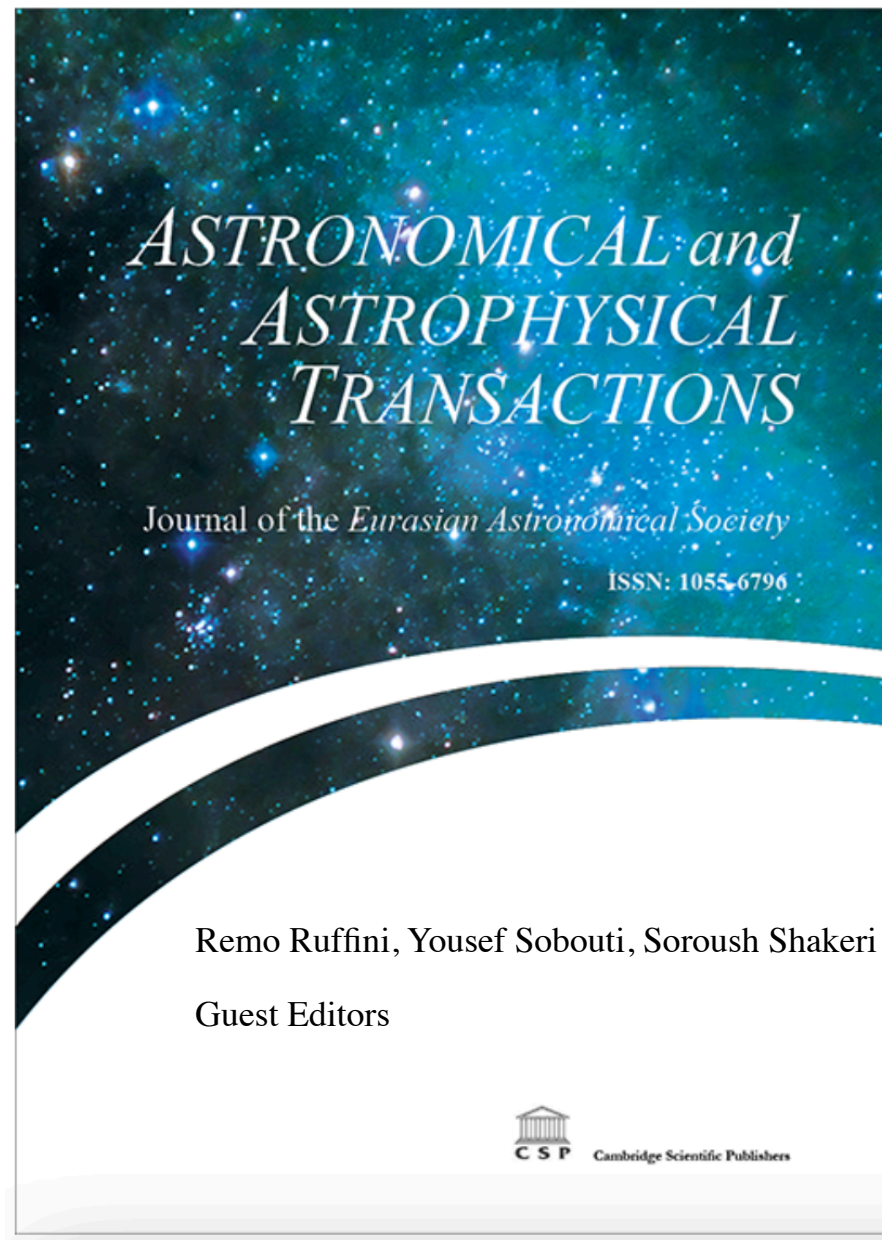


The last day of the meeting started with a talk given by Prof. Hossein Masoumi Hamedani about the similarities and the differences of the methods of Ibn al-Haytham and that of Galileo's discussing the Light of the Moon. Then Prof. Richard Kerner presented a historical talk from a European perspective about Astronomy in Islamic World. There were also several talks about the Dark Matter, Modified Gravity, and Early Universe Cosmology in the morning and afternoon sessions which made the program of the meeting richer.

At the end, I would like to mention, It was really a misfortune that we could not host our distinguished guests in the beautiful and historical city of Isfahan. However, this situation lets us get together virtually from all around the world and enjoy the nature at a deeper level. There were many fruitful discussions around the meeting and I hope this will create new networks among participants which will result in continued collaborations and joint activities in near future. It was a great pleasure for us to have the strong support of H.E. Mohammad Ali Zolfigol, Minister of Science, Research and Technology of the Islamic Republic of Iran to this significant event which marked the continuation of a longstanding, active, and fruitful collaboration between ICRANet and Iran and, more generally, between Italy and Iran. I hope that the ICRANet-Isfahan will become an active hub between Iranian and international astronomers, being Iranian National Observatory in Isfahan province is an additional value for ICRANet-Isfahan in this direction. We hope to see everyone in the next ICRANet-Isfahan Astronomy meeting to experience Isfahan in person.



Proceedings of ICRANet-Isfahan Astronomy Meeting is going to publish in Jan 2023 in *Astronomical and Astrophysical Transactions (AApTr)*, 2022, Vol. 33, Issue 3, pp. 177–180, ISSN 1055-6796, ©Cambridge Scientific Publishers.



ICRANet-ISFAHAN Workshop in 2022

IUT-INO Workshop on Transient Events and Multi Messenger Astrophysics

A virtual international workshop about "Transient events and multi messenger astrophysics" was held on 28-29 July 2022 (6-7 Mordad 1401).

This event was organized by IUT Department of Physics, the Iranian National Observatory (INO), and School of Astronomy (SoA) of the Institute for Research in Fundamental Sciences (IPM).

This workshop aimed at having optimal use of the 3.4-meter telescope of the INO, and other available and future observation equipment by researchers and students, and also increasing the capacity and development of the specialized manpower.

There were more than 290 registered participants including Postdocs, PhD, and MSc students with an average number of 100-140 attendees in each online presentation which attracted so much interests among

astrophysics community of Iran. This rich program of the workshop was articulated in 16 lectures given by prominent speakers invited mainly from the most well-known universities of **USA, UK, Italy, China, Armenia, and Iran**. The workshop was started by an opening talk given by **Prof. Habib Khosroshahi**, the director of INO, about the current status of INO and 3.4-meter telescope. Afterwards, **Prof. Hamidreza Safavi**, the vice-president for research of IUT, talked about the scientific and technological potentials of IUT in different aspects and future perspectives of IUT-INO collaborations.

During two days of the workshop, the most recent and upcoming discoveries in the time-domain astronomy have been discussed extensively and large astronomical surveys and observational approaches as well as messengers have been introduced for the young generation of the Iranian astrophysicists.

More information about the meeting and talks are available on:

<http://ino.ipm.ac.ir/conferences/workshop5/>

And records of the online presentations can be seen on:

https://www.aparat.com/INO_Events

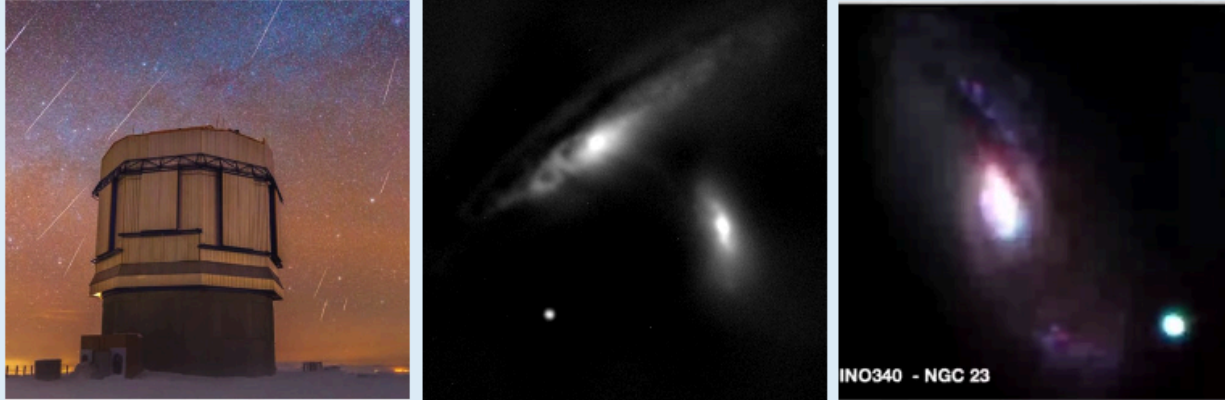




Photo: Mahdi Shamohammadi

The Iranian National Observatory

Iranian National Observatory Has Recorded the First Light Image of its 3.4m Optical Telescope



Iranian National Observatory (INO) at Mount Gargash, Isfahan Province (top left photo); The first image captured by INO showing a merger of a pair galaxies at about 320 Million Light-Years away from us (top right photo).

Iranian National Observatory (INO), as the largest home-grown scientific facility project in Iran, marks a major achievement with recording the first image by its 3.4m optical telescope (top left photo). The director of INO project **Habib Khosroshahi** says that “We’ve been waiting for this moment for so long,” [2]. This is the beginning of the commissioning process, during which the telescope optics and the control system will face rigorous tests and is the time in which the team seeks international and national collaborations. The captured test image belongs to an interacting galaxy pair called Arp282 which is located at about 320 million light years away in the constellation Andromeda (top right photo).

The national telescope has tens of thousands of parts including the optics, mechanics and the control hardware and software. Although facing lots of sanctions regarding high-tech imports, Iranian scientists and engineers after more than two decades of efforts since 2000 finally have been successful to build a world-class telescope. The project was designed and developed by the Institute for Research in Fundamental Sciences (IPM) and supported by the Ministry of Science and the State Vice Presidency for Technology.

Isfahan University of Technology (IUT) with only 137 km distance away from the INO site at **Mt. Gargash** enjoys many geographical, scientific, and technological privileges to make fruitful collaborations with INO. The Department of Physics of IUT and INO are now working on a long term collaboration plan on different aspects such as defining joint postdoctoral programs on observational astronomy which will be announced in near future. The programs include joint observational programs especially about transient events, joint technological developments with participation of technical departments of IUT and collaboration on data reduction processes and data sciences. It is worth mentioning that in July 2022, the Department of Physics of IUT and INO organized an international workshop on “Transient Events and Multi-messenger Astrophysics” with the aim of inspiring and training talented students and young generation of Iranian astrophysicists and to support them for having collaboration with the INO in near future.

For more information, please see the following references : [1] http://ino.org.ir/ino_first_light/
[2] <https://www.science.org/content/article/door-open-iranian-astronomers-seek-collaborations-their-new-world-class-telescope>,
[3] <http://ino.ipm.ac.ir/conferences/workshop5/>

A Visit Paid to the Iranian National Observatory by some Administrators and Faculty Members of the IUT Physics Department



A group of administrators and faculty members of the Department of Physics visited the National Observatory of Iran on June 16, 2022. In this visit, which was carried out at the invitation of **Prof. Habib Khosroshahi**, the director of the Iranian National Observatory (INO), **Prof. Seyed Zafarollah Kalantari**, the head of the Department of Physics, **Prof. Parviz Kameli**, deputy for the research of the Department, **Prof. Soroush Shakeri**, coordinator for international affairs of the Department, **Prof. Keivan Aghababaei Samani** and **Prof. Sedigheh. Sajadian**, faculty members of the Department, were the members of the IUT visiting team. During this visit, the joint cooperation fields have been reviewed and evaluated between the INO as one of the country's scientific macro projects and Isfahan University of Technology as one of the top Iranian universities with high subject rankings in physics and astrophysics. With only 137 km distance away from the INO site, IUT enjoys many geographical, scientific, and technological privileges to make fruitful collaborations with INO.

During this visit, the IUT teams talked about the possibility of Isfahan University of Technology hosting prominent Iranian and foreign astronomers at the university campus for having scientific cooperation. Also, both sides talked about initiating joint scientific projects with the participation of the INO in defining joint proposals and programs for postdoctoral researchers in IUT. There were also some discussions about organizing joint activities such as the first IUT-INO workshop on "Transient events and multi-messenger astrophysics" which was planned to be held on 28-29 July 2022. The visit continued by observing different parts of the observatory and the mechanical and control equipment of the telescope. Meanwhile, the details of a mutual agreement between IUT and INO was discussed either.



INO-IUT Joint Post-doctoral position in Observational Astronomy

Iranian National Observatory (INO) and Isfahan University of Technology (IUT) invite applicants for 2 joint postdoctoral positions in the following disciplines :

The accepted researchers will study the following subjects :

- ***Transient Events and Multi Messenger Astrophysics***
- ***Follow Up Observations of High Energy Sources***
- ***Gravitational Microlensing and Optical studies of compact Objects***

Iranian National Observatory 3.4m telescope has recorded its first light and is preparing to enter science operation from mid-2023. Successful applicants are expected to take part in the process of planning observations, instrument commissioning, data reduction and analysis and publications of the results. Solid knowledge of the programming languages, numerical and computational methods, and observational skills are useful for the selection process. The positions are funded for 1+1 years with a possibility of an extension for an additional one more year, upon satisfactory performance. Selected candidates according to the research programs will collaborate in the scientific activities in School of Astronomy, Institute for research in Fundamental sciences, IPM, Tehran, the Department of Physics of IUT, Isfahan. They are expected to commute and stay in the INO facilities at Mt. Gargash and its support station as required by their supervisors and line managers.

To apply, please send a letter stating qualifications and background, a CV including the list of publications, a statement of research interests and at least 2 confidential professional references, of which one should be obtained from the Ph.D. thesis supervisor.

Please send the applications to astro@ipm.ir with a cc to s.shakeri@iut.ac.ir

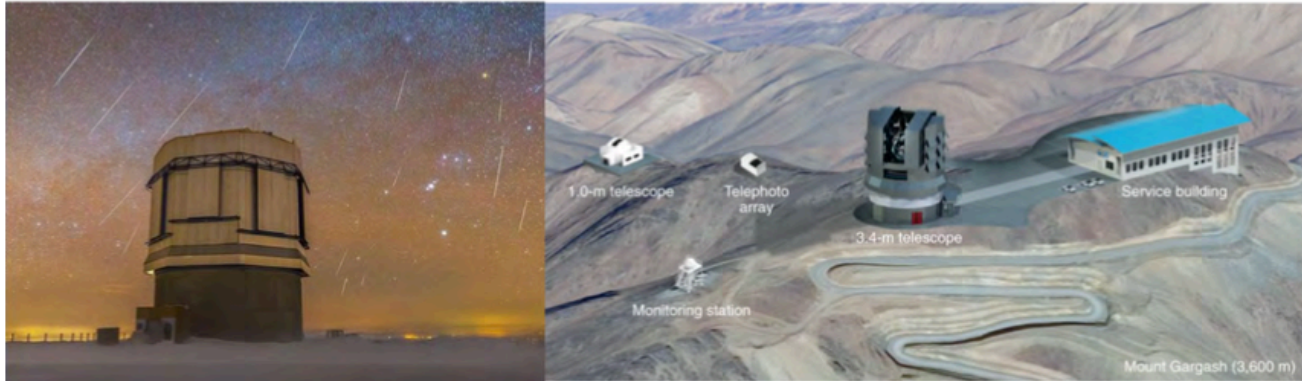
For further information please contact **Amin Farhang**(a.farhang@ipm.ir) or **Soroush Shakeri**(s.shakeri@iut.ac.ir)

The deadline for the application is January 31, 2023.

Please arrange that the recommendation letters to be sent directly to the above e-mails address before the deadline.

Proposal for Scientific Project Between ICRANet-Italy and ICRANet-Isfahan

Detectability of GRB Optical Prompt and Afterglows with INO340



A view of the Iranian National Observatory

Time-domain astronomy studies transient and variable sources that are unpredictable and often exhibit a temporal evolution of their physical properties. It is generally required to respond rapidly to such transient events. Accordingly, the time-domain astronomy missions of the Iranian National Observatory (INO340) will be of particular interest [1]. Iranian National Observatory Project is a medium size optical telescope with a primary diameter of 3.4m dedicated for observations of galactic and extra galactic sources. The telescope is a 3.4m diameter optical RC telescope benefiting from on axis Cassegrain focus and side Cassegrain stations. The high quality primary is actively supported to deliver a high quality image over a medium large field of 30 arcmin at the main Cassegrain focus. Field of view of 20 arcmin and 8 arcmin will be made available.

Although GRB afterglow studies have been revolutionized by Swift due to its fast slewing capability, the emission mechanism of GRBs at their inner engine remains an open question in modern cosmology. The optical imaging and polarimetric measurements will give us valuable information about the emission mechanism during the prime gamma-ray emission phase. Despite the advent of modern instrumentation in astronomy, it is still challenging and occasionally impossible to observe the afterglow of GRBs within seconds after their burst. One solution could be having a telescope with a slewing mount that can rotate rapidly, 10-20 degrees per second.

It is our goal to detect GRB afterglows and optical prompts with INO340. To that end, we should consider two main approaches which are photometry and polarimetry. Spectral lags and relative intensity changes of the optical and gamma-ray light curves will give us insight into the underlying emission process. Also, with polarimetry, it will be possible to determine the extent of polarization, and how it changes over time, along with the profile of the GRB light.

Similar observations have been made with various telescopes such as VLT[2], Gaia[3], MAGIC[4], AGILE-GRID[5] and Fermi-LAT[6]. As a result of an alert from the Neil Gehrels Swift Observatory, these telescopes have detected teraelectronvolt radiations.

Alongside these, high-precision polarimeters [7] have been used in observatories such as the 2.5m Nordic Optical Telescope (NOT) [8], La Palma; Danish 1.5m telescope, ESO, La Silla [9]; CASLEO 2.15 m telescope, Argentina [10]; CRAO 1.25 m telescope, Crimea[11]. They have been able to carry out observations leading to new discoveries using the unique polarimetric data.

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ICRANet-Mazandaran Iran Seat

Summary

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Introduction

University of Mazandaran (UMZ), currently the largest state higher education center in the province of Mazandaran, had formerly consisted of a number of tertiary education centers. In 1979 the centers were officially merged to form what is now known as the University of Mazandaran. In recent years, UMZ has made significant progress, expanding itself with vision both qualitatively and quantitatively. It presently includes 12 faculties on its campus: Faculty of Mathematical Sciences, Faculty of Theology and Islamic Sciences, Faculty of Marine and Oceanic Sciences, Faculty of Basic Sciences, Faculty of Arts and Architecture, Faculty of Law and Political Sciences, Faculty of Physical Education and Sports Sciences, Faculty of Humanities and Social Sciences, Faculty of Economics and Administrative Sciences, Faculty of Chemistry, Faculty of Technology and Engineering, and Faculty of Cultural Heritage, Handicrafts and Tourism.

UMZ has now about 12000 students who are currently studying at bachelor, Master, Ph.D., and postdoctoral levels and over 400 faculty members teaching and researching at different faculties of the university. Until 2016, more than 15000 students graduated from our university's different faculties. Based on the Iranian Ministry of Science, Research, and Technology (MSRT) policy, UMZ is committed to providing high-quality education and innovative research at bachelor, Master, and Ph.D. levels leading to scientific and technological achievements.



Main office building of UMZ



University of Mazandaran

ICRANet is the most prominent and authoritative research center in relativistic astrophysics in the world. One of the chief responsibilities of ICRANet is to help the growth and development of international activities in the field of relativistic astrophysics and other fields related to physics in different countries. ICRANet was founded in 1985 by renowned Italian physicist Professor Remo Ruffini (one of the best Scientifics in the world), Professor Riccardo Giacconi (winner of the Nobel Prize for Physics in 2002), Professor Abdul Salam (winner of the Nobel Prize for Physics in 1979), Professor Paul Boynton (professor at George Washington University), and several other leading physicists. Professor Remo Ruffini has been the director of this research institute since 2005.

ICRANet-Mazandaran is located at the campus of the UMZ, Babolsar, Mazandaran, Iran. The center was established in September 2020 following a memorandum of understanding signed between ICRANet, represented by Professor Remo Ruffini, and UMZ represented by Professor KourosHNozari. The main objectives of this memorandum of understanding are to promote the development and dissemination of scientific and technological research in the fields of cosmology, gravitation, and relativistic astrophysics between ICRANet and UMZ.

The ICRANet center of the UMZ was inaugurated on Saturday 28th of February 2021. The inauguration ceremony was attended by Professor KourosHNozari and Professor BehzadEslamPanah. The ICRANet-Mazandaran has now about 10 members which are currently working in different fields of gravity, cosmology, and astrophysics. From 2020 to 2022 the members of ICRANet-Mazandaran have published more than 50 papers in international journals. This center has a webpage with the following address:

<http://en.umz.ac.ir/index.aspx?&siteid=122&pageid=16197>



From left to right: Prof. Azizi, Prof. EslamPanah and Prof. Nozari



From left to right: Prof. Azizi, Prof. Nozari and Prof. EslamPanah

Seat agreement

The UMZ and ICRA Net have signed a memorandum of understanding in September 2020. This memorandum of understanding includes ten clauses. For more details, see the cooperation protocol on the next pages.



ICRANet



University of
Mazandaran

COOPERATION PROTOCOL

between

**INTERNATIONAL CENTER FOR RELATIVISTIC ASTROPHYSICS NETWORK
(ICRANet)**

and

UNIVERSITY OF MAZANDARAN

The International Center for Relativistic Astrophysics Network (ICRANet), represented by its Director, **Prof. Remo Ruffini**, and the University of Mazandaran, represented by its President, **Prof. Kourosh Nozari**, agree to establish this Cooperation Protocol which is governed by the following clauses:

FIRST:

The main objectives of this MoU are to promote the development and dissemination of scientific and technological research in the fields of cosmology, gravitation and relativistic astrophysics between ICRANet and University of Mazandaran.

SECOND:

The activities to be undertaken under this Cooperation Protocol will consist of joint actions involving one or more of the following items:

- I - The institutional exchange of graduate, post-graduate students, researchers and faculty members of ICRANet and University of Mazandaran;
- II - The development of teaching and/or research activities related to the areas of expertise and interest of ICRANet and University of Mazandaran;
- III - The organization of symposia, seminars, conferences and short courses on topics and areas of expertise and interest of ICRANet and University of Mazandaran;
- IV - The promotion and support of technical-scientific and cultural events and activities open to the public;

COOPERATION PROTOCOL between the **INTERNATIONAL CENTER FOR RELATIVISTIC
ASTROPHYSICS NETWORK (ICRANet)** and the **UNIVERSITY OF MAZANDARAN**

V – The development of opportunities to form university teachers and researchers, by means of specialized advanced high-level courses in areas of interest and expertise of ICRANet and University of Mazandaran;

VI –The organization of training and recycling courses and activities as well as the developing of inter-institutional research areas associated to local graduate programs;

VII –The promotion of joint publications;

VIII – Implementation of socially oriented activities through the academic extension;

IX – Exchange of information concerning teaching and research activities in both institutions signatory of this Cooperation Protocol.

THIRD:

The implementation of the activities envisaged by the contracting parties will be specified by means of Work Plans relative to this MoU, to be signed by the contracting parties at the time of definition of common projects, areas of research and education, or any other activities of mutual interest.

FOURTH:

The institutions signatories of this Cooperation Protocol shall adopt, as a general principle, and to the extent of their budgetary possibilities, the financing of academic actions carried out by this MoU. In the specific case of exchange of professional between the signatory institutions, the visiting institution shall endeavor efforts to cover transportation expenses of their students, professors and technicians while the hosting institution may cover their living expenses. To finance such expenses, participants must apply to granting agencies and other national or international institutions.

Students, professors, researchers and administrative staff taking part in exchange activities must have health insurance valid during those activities paid by the visiting part.

FIFTH:

When activities originating from this MoU result in products, improvements or innovations, subject to rights, both parties will establish - according to the law and to proper regulatory legislation, by means of specific MoU's and proportionally to the contribution of each institution - the conditions that will regulate property rights.

SIXTH:

The activities developed within the scope of this Cooperation Protocol will be carried by members of both parties, appointed by each institution, according to the nature of the activities in each project, the parties being allowed to rely upon the support of external organizations.

An overall coordinator will be appointed for each of the signing Institutions in order to monitor and supervise the implementation and progress of programs and projects related to the present Cooperation Protocol and to establish plans for the future of this cooperation.

For University of Mazandaran:

Prof. Kourosh Nozari, President of the University of Mazandaran;

For ICRANet:

Prof. Remo Ruffini, Director of ICRANet;

The coordinators will meet at least once a year or by electronic means (such as e-conference), or through visits to partner institutions.

SEVENTH:

This MoU will be valid for 5 (five) years, starting from the date of its signature. It will be extended automatically for another 5 (five) years through an exchange of letters between the signatories.

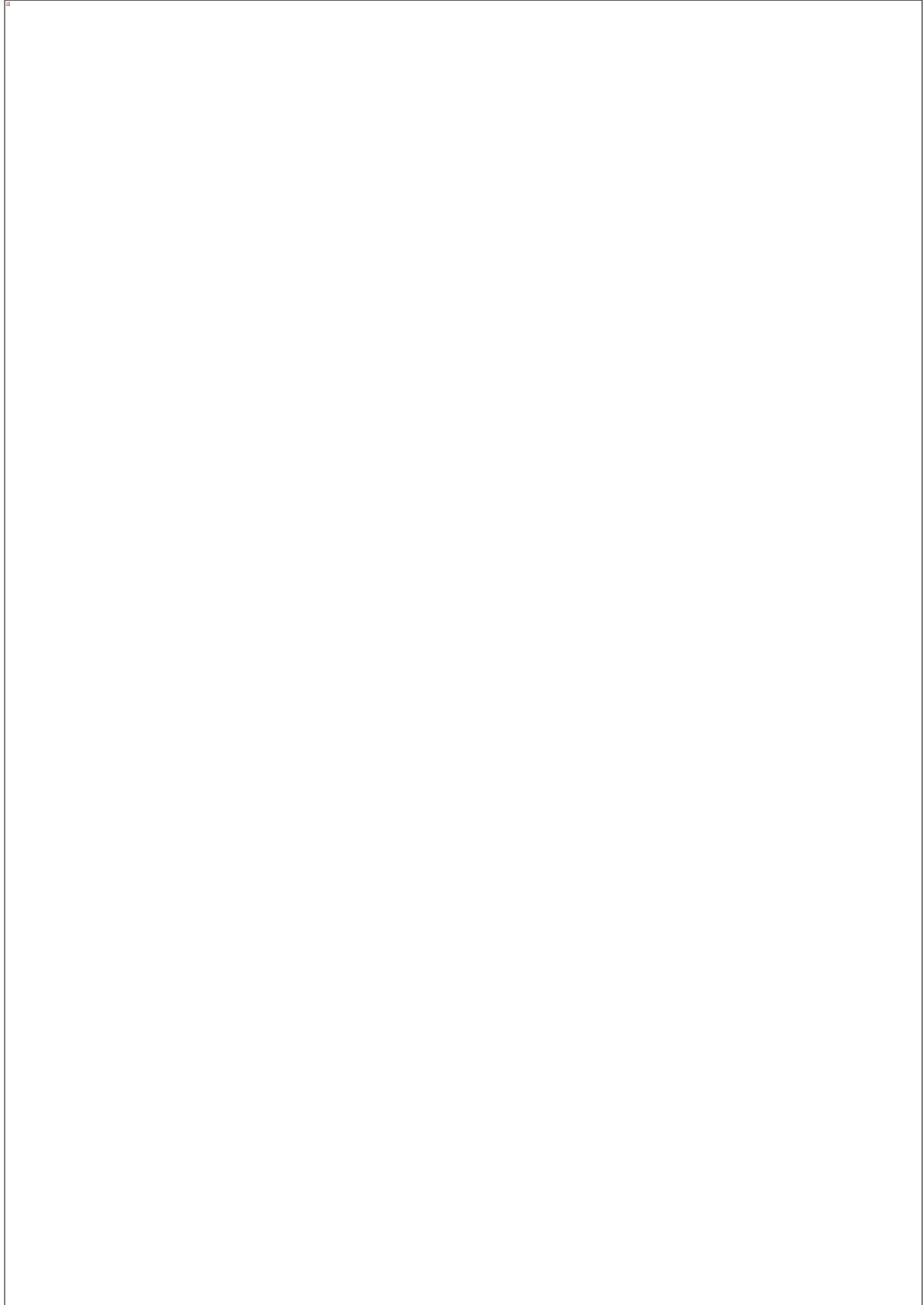
EIGHTH:

This MoU may be canceled by either of the parties, by means of a notification at least 60 (sixty) days in advance - which may be waived if both parties come to a consensual agreement - being advisable, however, to attempt to ensure that ongoing activities are maintained.

NINTH:

Any necessary modification to the present Cooperation Protocol must be stated in Additional Terms that will be negotiated between the parties, without prejudice to ongoing activities.

In particular this MoU could be extended to other partnerships, through the express agreement of the parties through an Additional Term.



Members of ICRA Net-Mazandaran



Behzad Eslam Panah (Coordinator)

Dr. Behzad Eslam Panah is currently an assistant professor of theoretical physics at UMZ, Iran. He received his Ph.D. on “*massive compact objects in modified theories of gravity*” from Shiraz University in 2017. Also, he followed his study as a postdoc on “*hybrid and quark stars*” at Shiraz University from 2018 to 2019. He follows several interesting issues in theoretical physics such as complicated black hole solutions, nonlinear electrodynamics, thermodynamics of black holes, the structure of compact objects (neutron stars, white dwarfs, hybrid stars, and quark stars), and also dark energy stars in modified theories of gravity.



Kourosch Nozari

Dr. Kourosch Nozari is currently a professor of Theoretical Physics at UMZ, Iran. He received his Ph.D. in “*early universe cosmology*” from the Sharif University of Technology. Currently, he works on several issues in theoretical physics, mainly on early universe cosmology, quantum gravity phenomenology, and also black

hole physics. He leads an active research group in the department of theoretical physics, UMZ.



AlirezaKhesali

Dr. AlirezaKhesali is currently a professor of astrophysics at UMZ, Iran. He received his Ph.D. in “*Study the dynamical and Ionization structure of planetary nebulae in three dimensions*” from Ferdowsi University of Mashhad in 2001. His research interests are interstellar medium and astrophysical plasma.



JafarSadeghi

Dr. JafarSadeghi is a professor of theoretical physics at UMZ, Iran. His research interests focus on particle physics, cosmology, AdS/CFT correspondence, and string theory.



Mohsen Nejad-Asghar

Dr. Mohsen Nejad-Asghar is currently an associate professor of astrophysics at UMZ, Iran. He received his Ph.D. on “*thermal instability in the interstellar medium*” from Ferdowsi University of Mashhad in 2004. He follows several interesting issues in astrophysics such as thermal instability, infrared dark clouds, molecular cloud formation, star and planet formation, and accretion disks around proto-stars.



TaherehAzizi

Dr. TaherehAzizi is an assistant professor of theoretical physics at UMZ, Iran. She received her Ph.D. from UMZ in 2010. Her research interests focus on cosmology and gravity in various theories of gravity.



NargesRashidi

Dr. NargesRashidi is currently an assistant professor of theoretical physics at UMZ, Iran. She received her Ph.D. in *Cosmological Dynamics of Braneworld Scalar Fields* from the University of Mazandaran in 2014. She follows several interesting issues in theoretical physics such as cosmological Inflation, primordial perturbations, and non-Gaussianity, the effects of the natural cutoffs in cosmology, dark energy, and late time acceleration.



SaeedehSadeghian

Dr. SaeedehSadeghian is currently an assistant professor of theoretical physics at UMZ, Iran. She received her Ph.D. in *“the symmetries of near horizon extremal geometries of black holes”* from Alzahra University in 2016. She followed her study as a postdoc at IPM from 2016 through 2019. She was experienced in working on quantum integrability at Wigner institute (2019-2020). Her research interests focus on the problems in the AdS/CFT and the recent trends including the

asymptotic symmetry group in the curved spacetimes and the resurgence in integrable field theories.



Azar Khosravi

Dr. Azar Khosravi is a faculty member in the physics department of UMZ, Iran. She joined the physics department of UMZ in 2016. She obtained her Ph. D. in theoretical astrophysics from the University of Mazandaran in 2014. Her research experience and interests are in the field of black hole accretion disks with an emphasis on the stability analysis of these systems. Also, her research includes a wide range of subjects such as self-gravitating accretion flow, fragmentation, jets, and outflow from disks.

Scientific activity of ICRA Net-Mazandaran

The main scientific activities of ICRA Net-Mazandaran are on several issues in theoretical physics, mainly on early universe cosmology, black hole physics, complicated black hole solutions, and their thermodynamics in the presence (non)linear electrodynamics and modified theories of gravity, quantum gravity phenomenology, the structure of compact objects (such as neutron stars, white dwarfs, hybrid stars, and quark stars), jets and outflow from disks, infrared dark clouds, molecular cloud formation, star, and planet formation, accretion disks around protostars, AdS/CFT correspondence, dark energy and dark matter. Briefly, the members of ICRA Net-Mazandaran work on the following subjects:

1. Gravity

- Modified Theories of Gravity
- AdS/CFT correspondence
- Quantum Gravity
- Gravitational waves
- Gravastars
- Black Holes Physics

2. Astrophysics

- Neutron Stars
- Quark Stars
- Interstellar Medium

3. Cosmology

- Dark Energy and Dark Matter
- Inflation and Cosmological Perturbations

Recent publications (2022)

1-Thermal stability, P - V criticality and heat engine of charged rotating accelerating black holes

BehzadEslamPanah, and KhadijeJafarzade

Journal Ref: General Relativity and Gravitation 54 (2022) 19

DOI: <https://doi.org/10.1007/s10714-022-02904-9>

arXiv: <https://arxiv.org/abs/1906.09478>

2-The structure of hybrid neutron star in Einstein- Λ gravity

TayyebehYazdizadeh, Gholam HosseinBordbar, and BehzadEslamPanah

Journal Ref: Physics of the Dark Universe 35 (2022) 100982

DOI: <https://doi.org/10.1016/j.dark.2022.100982>

arXiv: <https://arxiv.org/abs/1902.04887>

3-Structure of magnetized strange quark star in perturbative QCD

JalilSedaghata, Seyed Mohammad Zebarjad, Gholam Hossein Bordbara, and BehzadEslamPanah

Journal Ref: PhysicsLettersB829(2022)137032

DOI: <https://doi.org/10.1016/j.physletb.2022.137032>

arXiv: <https://arxiv.org/abs/2204.01333>

4-Neutron stars in mimetic gravity

HajarNoshad, Seyed Hossein Hendi, and BehzadEslamPanah

Journal Ref: Eur. Phys. J. C 82 (2022) 394

DOI: <https://doi.org/10.1140/epjc/s10052-022-10358-1>

arXiv: <https://arxiv.org/abs/2111.03924>

5-Is the remnant of GW190425 a strange quark star?

JalilSedaghat, Seyed Mohammad Zebarjad, Gholam Hossein Bordbar,
BehzadEslamPanah, Rahim Moradi

Journal Ref: PhysicsLettersB833(2022)137388

DOI:<https://doi.org/10.1016/j.physletb.2022.137388>

arXiv: <https://arxiv.org/abs/2104.00544>

6-Dark energy star in gravity's rainbow

AliyehBagheriTudeshki, Gholam Hossein Bordbar, and BehzadEslamPanah

Journal Ref: PhysicsLettersB835(2022)137523

DOI:<https://doi.org/10.1016/j.physletb.2022.137523>

arXiv:<https://arxiv.org/abs/2208.07063>

7-Two-dimensional Lifshitz-like AdS black holes in F (R) gravity

BehzadEslamPanah

Journal Ref: J. Math. Phys. 63 (2022) 112502

DOI:<https://doi.org/10.1063/5.0104272>

arXiv: <https://arxiv.org/abs/2210.11249>

8-Visible energy alternative to dark energy

Maryam Roushan, NargesRashidi, and KourosHNozari

DOI: <https://doi.org/10.1016/j.cjph.2022.03.025>

arXiv: <https://arxiv.org/abs/2204.07180>

9-Constant-roll inflation with hilltop potential

NargesRashidi, MohaddesehHeidarzadeh, andKouroshNozar

Journal Ref: Eur. Phys. J. Plus 137 (2022) 514

DOI:<https://doi.org/10.1140/epjp/s13360-022-02740-5>

10-Inflation in energy-momentum squared gravity in light of Planck 2018

MarzieFaraji, NargesRashidi, andKouroshNozari

Journal Ref: Eur. Phys. J. Plus 137 (2022) 593

DOI:<https://doi.org/10.1140/epjp/s13360-022-02820-6>

arXiv: <https://arxiv.org/abs/2107.13547>

11-Radiation from Hayward Black Hole via TunnelingProcess in Einstein-Gauss-Bonnet Gravity

ShadiShahraeini, KouroshNozari, and Sara Saghafi

Journal Ref:Journal of Holography Applications in Physics 2 (2022) 55

DOI: <https://doi.org/10.22128/jhap.2022.585.1033>

12-Hawking temperature for 4D-Einstein-Gauss-Bonnetblack holes from uncertainty principle

Sara Azizi, SarehEslamzadeh, Javad T. Firouzjaee, and KouroshNozari

Journal Ref:Nuclear Physics B985 (2022) 115993

DOI: <https://doi.org/10.1016/j.nuclphysb.2022.115993>

arXiv: <https://arxiv.org/abs/2204.08144>

13-Black holes in dRGT massive gravity with the signature of EHT observations of M87*

Seyed Hossein Hendi, KhadijeJafarzade,and BehzadEslamPanah

Journal Ref: accepted in JCAP

arXiv: <https://arxiv.org/abs/2206.05132>

14-Charged Accelerating BTZ black holes

BehzadEslamPanah

Submitted to an International Journal

arXiv: <https://arxiv.org/abs/2203.12619>

15-Three-dimensional AdS black holes in massive-power-Maxwell theory

BehzadEslamPanah, KhadijeJafarzade, and Aangel Rincon

Submitted to an International Journal

arXiv: <https://arxiv.org/abs/2201.13211>

Two members of ICRANet-Mazandarnamong the top two percent of most cited authors in 2022

The recent update of the publicly available database of over 100,000 top scientists listed by Elsevier in 2022, indicates that Prof.KouroshNozariand Prof.BehzadEslamPanah are on this list.



Prof. BehzadEslamPanah



Prof. KouroshNozari

The first visiting member of ICRANet- Mazandaran at ICRANet

Prof. Behzad Eslam Panah is the first visiting member of ICRANet-Mazandaran at ICRANet. He went to ICRANet (Pescara, Italy) on 1 September 2022. He stayed there for 24 days. During this visit, he participated in the 31st Texas Symposium on Relativistic Astrophysics (from September 12 to 16), held in Prague (Czech Republic) with Prof. Remo Ruffini and ICRANet Faculty Professors.



Prof. Behzad Eslam Panah

The member of ICRANet-Mazandaran as an editor in two international journals

Prof. Behzad Eslam Panah is an editor in **Galaxies** and **Frontiers in Physics** journals.

- **Galaxies**
<https://www.mdpi.com/journal/galaxies>
- **Frontiers in Physics**
<https://www.frontiersin.org/journals/physics/sections/high-energy-and-astroparticle-physics>