International Conference on Advances in Physics 2015

Preface

The International Conference on Advances in Physics 2015 (ICAP 2015) was held at the University of Rajshahi on 18-19 April 2015. The conference was organised by the Department of Physics, University of Rajshahi, in collaboration with the Bangladesh Physical Society.

The Department of Physics here at the University of Rajshahi has been lucky to have a few of the most productive physicists in the country. This has led to a comparatively vibrant culture of research here, by country standards. However, for quite some time, there had not been any conferences held here. In this situation, there was a decision to organise a conference of high quality, trying to avoid typical weaknesses of conferences in our country.

It was decided that we would invite plenary and keynote speakers solely on the basis of their contributions to physics, and this was meticulously followed. The selection of abstracts and peer review was done with due integrity. We decided to budget for funds to publish selected articles from the conference in J Phys Conf Series. We were also to have a public lecture session on contemporary topics pertinent to the needs of the country.

Professor M Aminul Islam was Chairman of the Organising Committee. The Chairman of the Department, Professor Somnath Bhattacharjee was Co-Chairman. An International Advisory Committee was formed with eminent scientists from home and abroad.

Due to political instability, there was a loss of international participation. Originally scheduled for 3-4 March 2015, the date also had to be shifted. Eventually we decided to go ahead on a revised date of 18-19 April 2015. There were around 120 participants.

The conference was inaugurated by the Vice-Chancellor of the University of Rajshahi, Professor M Mizanuddin. This was held at the university’s Senate Building. The main academic sessions then proceeded in the Department of Physics located in the 1st Science Building (later renamed Satyendra Nath Bose Building) with parallel sessions held in the Ahmad Husain Gallery and Rooms 211 and 311.

The conference endeavoured to cover all the active areas of physics research in the country. The submissions were divided into the following five streams:

- Nuclear and Particle Physics
- Materials Science
- Medical and Health Physics
- Condensed Matter Physics
- Atomic Physics and Nonlinear Optics
There were four plenary lectures. Professor A A Mamun, a pioneer in theoretical plasma physics, introduced to the participants the cutting-edge research in the field of dusty plasma. Professor A K Basak presented the novel aspects of non-monotonic nuclear potential in analyzing the nuclear scattering phenomena. Professor A K M A Islam talked about the optical properties of industrially important MAX phase nanolaminates and the recently discovered exciting 2D MAXene compounds. Professor B N Dev presented on the quantum effects in nanostructures.

In parallel sessions for each stream, prominent physicists from the country were invited to present keynote addresses. Research on Bose condensation and the Casimir effect in $d$-dimensional imperfect gas was presented by Professor G M Bhuiyan. Professor M A Uddin described various methodologies developed recently to calculate the reaction cross-sections of electron impact ionization. Professor M G Mortuza talked about the NMR technique in regard to structural characterization of amorphous materials. Dr S M Hossain presented an overview of neutron activation analysis technique and its application to health and environmental sciences. Professor A F M Yousuf Haider enlightened the participants on the field of LASER physics and nonlinear optics. Professor M K R Khan spoke about fabrication and characterization of semiconducting materials for photovoltaic and optoelectronic device applications. The question of fine tuning of the fundamental constants in nature was addressed by Professor A S B Tariq during the conference. Professor S H Naqib proposed a scenario where the unconventional doping dependent isotope exponent in hole doped high-$T_c$ cuprates were not directly linked with Cooper pairing.

In addition to these, over seventy papers on various fields of physics were selected for oral presentations. Young researchers took part enthusiastically in the poster sessions where around thirty posters were presented. The conference Book of Abstracts is available here.

On the evening of 18 April, there was a Cultural Programme at the Kazi Nazrul Islam Auditorium, followed by the Conference Dinner at the Nanking Darbar Hall.

The conference returned to the Senate Building for the Concluding Session which also included two public lectures. The first one was by Engr M Ali Zulquarnain on nuclear safety and management, as Bangladesh is focusing on nuclear energy in recent years; while the second one by Dr S R Malik was on cancer and radiation oncology, another matter of priority and public interest in this country.

We would also like to express our gratitude to Islami Bank Bangladesh Ltd, Pundro University of Science and Technology, Jalalabad Ragib-Rabeya Medical College and Hospital, University Grants Commission of Bangladesh, Mr Md Ekramul Haque (Chittagong), PRAN Foods Ltd., Bangladesh Energy Regulatory Commission, Bangladesh Atomic Energy Commission and other sponsors for their generous support, which was crucial in making this conference a success. Members of the various committees worked hard to make the conference a success. We would like to acknowledge the support of a lively group of student volunteers and some key staff members of the department for their roles in the organisation of ICAP 2015. We are also grateful to the reviewers for their role in selecting and improving these contributions.

Overall the participants commended the academic standards of the conference. They also, generally, appreciated the organisation and hospitality.

The Proceedings of ICAP 2015 consists of a rigorous selection of 20 peer-reviewed papers which were presented during the conference. It is expected that the Proceedings will be of significant interest to the researchers working on various fields of physics and materials science.
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# Programme Overview

## 18 April 2015

| Time     | Event                                      |
|----------|--------------------------------------------|
| 0930-1030| **Inauguration**                           |
|          | *Senate Building*                          |
| 1030-1045| Tea Break                                  |
| 1045-1145| **Plenary Session I**                     |
|          | *Ahmad Husain Gallery*                     |
| 1045-1145| Plenary-1                                  |
| 1145-1245| Plenary-2                                  |
| 1200-1400| Lunch Break                                |
| 1300-1430| **Parallel Session 1**                    |
|          | *1A-Ahmad Husain Gallery*                 |
| 1300-1430| EHM-Keynote-1                              |
| 1430-1445| MS-Keynote-1                               |
| 1445-1500| CMP-Keynote-2                              |
| 1500-1515| EHM-Oral-1                                 |
| 1515-1530| MS-Oral-1                                  |
| 1530-1545| CMP-Oral-1                                 |
| 1545-1600| EHM-Oral-2                                 |
| 1600-1615| MS-Oral-2                                  |
| 1615-1630| CMP-Oral-2                                 |
| 1630-1645| EHM-Oral-8                                 |
| 1645-1700| MS-Oral-8                                  |
|          | Tea Break                                  |
| 1700-1715| **Parallel Session 2**                    |
|          | *2A-311*                                   |
| 1700-1715| EHM-Oral-9                                 |
| 1715-1730| CMP-Keynote-1                              |
| 1730-1745| APNLO-Keynote-1                            |
| 1745-1800| EHM-Oral-11                                |
| 1800-1815| CMP-Oral-7                                 |
| 1815-1830| APNLO-Oral-1                               |
| 1830-1845| Prayer Break                               |
| 1845-1900| **Parallel Session 3**                    |
|          | *3A-311*                                   |
| 1845-1900| EHM-Oral-14                                |
| 1900-1915| CMP-Oral-11                                |
| 1915-1930| NPP-Keynote                                |
| 1930-1945| EHM-Oral-16                                |
| 1945-2000| Transport to Dinner                        |
| 2000-2130| Conference Dinner                          |
### 19 April 2015

#### Plenary Session 2

**Ahmad Husain Gallery**

| Time     | Session       |
|----------|---------------|
| 0900-1000| Plenary-3     |
| 1000-1100| Plenary-4     |
| 1100-1115| Tea Break     |

#### Parallel Session 4

| Time      | Session             |
|-----------|---------------------|
| 1115-1130 | EHM-Oral-18         |
| 1130-1145 | MS-Keynote-2        |
| 1145-1200 | NPP-Oral-3          |
| 1200-1215 | EHM-Oral-20         |
| 1215-1230 | MS-Oral-10          |
| 1230-1245 | NPP-Oral-5          |
| 1245-1300 | MS-Oral-14          |
|           | MS-Oral-15          |
| 1300-1400 | Lunch Break         |
| 1400-1530 | Poster Session      |
| 1530-1545 | Tea Break and Transfer to Public Lecture |

#### Public Lecture Session

| Time      | Session                                      |
|-----------|----------------------------------------------|
| 1545-1645 | Public Lecture                               |
| 1645-1700 | Prayer Break                                 |
| 1700-1720 | Inauguration of Parallel Computing Cluster   |
| 1720-1820 | Public Lecture                               |
| 1820-1830 | Closing Remarks and Farewell                 |

The conference Book of Abstracts is available [here](#).
A selection of photographs from the event

Inauguration at Senate Building with (from left) Chairman, Department of Physics Professor Somnath Bhattacharjee, Pro Vice-Chancellor, University of Rajshahi Professor Chowdhury Sarwar Jahan, Vice-Chancellor Professor M Mizanuddin, Conference Chair Professor M Aminul Islam and Conference Secretary Professor Saleh Hasan Naqib

A section of the audience during the inaugural session at the Senate Building
Group photo of the participants in the gardens of the Department of Physics

A parallel session in Room 311, 1st Science Building (Department of Physics)
A parallel session in Room 211, 1st Science Building (Department of Physics)

A parallel session in the Ahmad Husain Gallery, 1st Science Building (Department of Physics)
The plenary speakers (clockwise from top left) Professor Arun K Basak, Professor Bhupendra N Dev, Professor A K M Azharul Islam, and Professor A A Mamun

A few of the keynote speakers (clockwise from left) Professor M Alfaz Uddin, Professor G M Bhuiyan and Professor M Khalilur Rahman Khan
Some glimpses of the lively interaction

A group of participants at the conference dinner at Nanking Darbar Hall
Another group of participants at the conference dinner at Nanking Darbar Hall

Public lectures during the closing session by (left) Engr M Ali Zulquarnain on nuclear safety and the Rooppur Nuclear Power plant; and (right) Dr Sadiq R Malik on cancer and radiation oncology
Inauguration of the Arun High Performance Computing Cluster

A section of the audience during the closing ceremony and public lecture session
List of Participants
(in alphabetical order of surname)

| Surname  | First Name(s)     | Affiliation                                   |
|----------|-------------------|-----------------------------------------------|
| Afroj    | Mst Naznin        | University of Rajshahi                        |
| Afroz    | Mst Sharmin       | University of Rajshahi                        |
| Ahammad  | Md Parvez         | University of Rajshahi                        |
| Ahsan    | M Rafiqul         | University of Rajshahi                        |
| Alam     | Md Ekhtiar        | University of Rajshahi                        |
| Ali      | Md Ashraf         | Chittagong University of Engineering and Technology |
| Ali      | Md Leaket         | University of Rajshahi                        |
| Ali      | Soheb             | University of Rajshahi                        |
| Alim     | Nazmul            | Gono University                               |
| Al-Mamun | Abdullah          | Khulna University                             |
| Alom     | Md Jahangir       | University of Rajshahi                        |
| Ara      | Firdaus           | University of Rajshahi                        |
| Ara      | Ifat              | University of Rajshahi                        |
| Azad     | Abul Kalam        | Rayermohal College, Khulna                    |
| Azad     | Md Masum Billah   | University of Rajshahi                        |
| Azam     | Afsana            | Dhaka University of Engineering and Technology |
| Banu     | Dilruba Akter     | University of Rajshahi                        |
| Banu     | Laila Arjumand    | University of Rajshahi                        |
| Basak    | Arun Kumar        | University of Rajshahi                        |
| Bashar   | Md Khademul       | University of Rajshahi                        |
| Bhattacharjee | Prajna Paramita | University of Rajshahi                      |
| Bhattacharjee | Somnath   | University of Rajshahi                        |
| Bhuviyan | G M               | University of Dhaka                           |
| Billah   | M Masum           | University of Rajshahi                        |
| Biswas   | Piya              | University of Rajshahi                        |
| Dash     | Unnati Rani       | University of Rajshahi                        |
| Dev      | B N               | Indian Association for the Cultivation of Science, Kolkata |
| Eti      | Rojoni Biswas     | University of Rajshahi                        |
| Fatima   | Kaniz             | Khulna University                             |
| Hadi     | Md Abdul          | University of Rajshahi                        |
| Haider   | A F M             | University of Dhaka                           |
| Hakim    | M Obaidul         | University of Rajshahi                        |
| Halder   | Sajib             | Shahjalal University of Science and Technology |
| Haque    | A K Fazlul        | University of Rajshahi                        |
| Haque    | Enamul            | University of Rajshahi                        |
| Haque    | M Monirul         | University of Rajshahi                        |
| Haque    | Md Mozammel       | University of Rajshahi                        |
| Haque    | S N M Raqibul     | University of Rajshahi                        |
| Hasan    | Khandker Mahmudul | University of Rajshahi                        |
| Surname | First Name(s) | Affiliation |
|---------|---------------|-------------|
| Hasan   | Md Rabiul     | Khulna University |
| Hasan   | Razibul       | Khulna University |
| Hassan  | Md Rabiul     | University of Rajshahi |
| Hossain | M Alamgir     | University of Rajshahi |
| Hossain | M Ismail      | University of Rajshahi |
| Hossain | Md Alamgir    | University of Rajshahi |
| Hossain | Md Arman      | University of Rajshahi |
| Hossain | Md Imran      | Khulna University |
| Hossain | Sheikh Dobir  | Jessore University of Science and Technology |
| Islam   | A K M Azharul | International Islamic Univeristy Chittagong |
| Islam   | F Nazrul      | University of Rajshahi |
| Islam   | M Aminul      | University of Rajshahi |
| Islam   | M A           | INST, Atomic Energy Research Establishment, Savar, Dhaka |
| Islam   | M Shafiqul    | University of Rajshahi |
| Islam   | Md Moinul     | University of Rajshahi |
| Islam   | Md Mominul    | University of Rajshahi |
| Islam   | Md Mydul      | University of Rajshahi |
| Islam   | Md Rakibul    | Khulna University |
| Islam   | Md Shahinur   | University of Rajshahi |
| Islam   | Md Shariful   | University of Rajshahi |
| Islam   | Md Sujan      | University of Rajshahi |
| Islam   | Md Tahidul    | University of Rajshahi |
| Islam   | Md Taufiqul   | University of Rajshahi |
| Islam   | Raihana Shams | University of Rajshahi |
| Jahan   | Nusrat        | Chittagong University of Engineering and Technology |
| Kabir   | Md Hasnat     | University of Rajshahi |
| Kamruzzaman | Md | University of Rajshahi |
| Karim   | Al Momin Md Tanveer | Rajshahi University of Engineering and Technology |
| Karim   | Rezaul        | University of Rajshahi |
| Kayesh  | Md Emrul      | University of Rajshahi |
| Khan    | M Khalilur Rahman | University of Rajshahi |
| Khatun  | Mousumi       | University of Rajshahi |
| Khatun  | Mst Moushumi  | University of Rajshahi |
| Khatun  | Mst Popy      | University of Rajshahi |
| Khatun  | Mst Rokeya    | University of Rajshahi |
| Kobra   | Monira Jannatul | University of Rajshahi |
| Lucy    | Irine Banu    | University of Rajshahi |
| Mahmud  | Md Hayet      | University of Rajshahi |
| Majumder | A             | University of Phoenix Online |
| Majumder | Rinku         | University of Rajshahi |
| Malik   | Sadiqr R      | Delta Medical College and Hospital, Dhaka |
| Mamun   | A A           | Jahangirnagar University |
| Miah    | Mohammad Julhash | Bangladesh University of Engineering and Technology |
| Surname    | First Name(s)    | Affiliation                                      |
|------------|------------------|-------------------------------------------------|
| Mistry     | Samiron          | Khulna University                                |
| Mortuza    | M Golam          | University of Rajshahi                           |
| Mostakim   | Md Romman        | University of Rajshahi                           |
| Naher      | Mst Irin         | University of Rajshahi                           |
| Naqib      | Saleh Hasan      | University of Rajshahi                           |
| Parves     | Sohag            | Khulna University                                |
| Parvin     | Fahmida          | University of Rajshahi                           |
| Parvin     | Ruma             | University of Rajshahi                           |
| Parvin     | Tania            | University of Rajshahi                           |
| Patoary    | Atiqur Rahman    | University of Rajshahi                           |
| Qabid      | Ihtisham         | University of Rajshahi                           |
| Rahim      | M Rezaur         | University of Rajshahi                           |
| Rahman     | Lutfar           | University of Rajshahi                           |
| Rahman     | M Mozibur        | University of Rajshahi                           |
| Rahman     | Md Ashiqur       | University of Rajshahi                           |
| Rahman     | Md Matiur        | University of Rajshahi                           |
| Rajib      | Arifuzzaman      | University of Rajshahi                           |
| Reya       | Farhana Sultana  | Khulna University                                |
| Reza       | Md Ali           | Khulna University                                |
| Reza       | Md Shohel        | Delta Medical College and Hospital, Dhaka        |
| Roknuzzaman| Md               | Jessore University of Science and Technology     |
| Rose       | Rozina           | University of Rajshahi                           |
| Roy        | Preangka         | Khulna University                                |
| Saha       | Sonet Kumar      | ZH Sikder University of Science and Technology, Shariatpur |
| Sarker     | Md Abdur Razzaque| University of Rajshahi                           |
| Sarker     | Samiul Islam     | University of Rajshahi                           |
| Shah       | Md Abdul Hadi    | Rajshahi University of Engineering and Technology|
| Shahnowaz  | Md               | Akbar Ali College, Ullahepara                    |
| Sharmin    | Monira           | University of Rajshahi                           |
| Sona       | Kabbo            | University of Rajshahi                           |
| Tariq      | Abdullah Shams Bin| University of Rajshahi                          |
| Tasnim     | Bushra           | University of Rajshahi                           |
| Uddin      | Md Borhan        | International Islamic University Chittagong      |
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| Uddin      | Prof M Alfaz     | University of Rajshahi                           |
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| Zulquarnain| M Ali            | Bangladesh Atomic Energy Comission               |
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