A Brief Report on

National Conference on Radiation Physics

NCRP-2017

23-24 November 2017

Organized by

Department of Physics, Bangalore University, Bengaluru
In Collaboration with
AMD, Bengaluru

Submitted to

Bangalore University

By

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REPORT ON THE TWO DAY NATIONAL CONFERENCE ON RADIATION PHYSICS (NCRP), 23-24 NOVEMBER 2017, BENGALURU

A two day National Conference on Radiation Physics (NCRP 2017), was organized during 23-24, November 2017 by Department of Physics, Bangalore University, Bengaluru (BUB) in collaboration with Atomic Minerals Directorate for Exploration and Research (AMD), Bengaluru. The program was supported by the Bangalore University, Bengaluru, Board of Research in Nuclear Sciences (BRNS), BARC, Mumbai, AMD, Bengaluru and was sponsored by M/s Nucleonix Systems Pvt Ltd, Hyderabad, M/s PLA Electro Appliances (P) Ltd, Mumbai, Acharya Institutes and Indian Academy Degree College (Autonomous) Bengaluru.

The National Advisory Committee consisted of Prof. H. N. Ramesh, Vice Chancellor, Bangalore University, Prof. B. K. Ravi, Registrar, Bangalore University, Prof. I. S. Shivakumara, Dean, Faculty of Science, BUB, Dr. K. S. Pradeep Kumar, RSSD, BARC, Mumbai, Prof. P. Venkataramaiah, Ex-VC, Kuvempu University, Shivamogga, Dr. Lalit Varshney, BARC, Mumbai, Shri. L. K. Nanada, Director, AMD, Hyderabad, Shri. A. K. Bhatt, Regional Director, AMD, Bengaluru, Dr. Nagesh N. Bhat, RPAD, BARC, Mumbai, Dr. N. Kumar, FCD, BARC, Mumbai, Dr. Ashutosh Dash, RC & IG, BARC, Mumbai, Shri. B.N. Dileep, ESL, Kaiga, Prof. N. Karunakara, CARER, Mangalore University, Mangaluru, Prof. T.K. Umesh, Department of Studies in Physics, University of Mysore, Mysuru and Prof. N. Nagaiah, Convener of NCRP 2017, Department of Physics, Bangalore University, Bengaluru.

The Scientific Programme Committee consisted of Dr. M. R. Iyer, Ex-BARC, Mumbai, Dr. Nagesh N. Bhat, RPAD, BARC, Mumbai, Dr. S. Murali, HS & E, BARC, Mumbai, Shri. P. K. Sharma, AMD, Hyderabad, Shri. B. Ram Mohan Reddy, AMD, Bengaluru, Dr. Joshy P. James, ESL, Kaiga, Shri. S. K. Suman, RSSD, BARC, Mumbai, Dr. N. Karunakara, CARER, Mangalore University, Mangaluru, Dr. N. M. Badiger, Karnatak University, Dharwad, Dr. V. Ravindrachari, Mangalore University, Mangaluru, Dr. B. R. Kerur, Gulbarga University, Gulbarga, Dr. A. P. Gnana Prakash, University of Mysore, Mysuru, Dr. Ganesh Sanjeev, Microtron, Mangalore University, Mangaluru, Dr. G. V. Ashok, Govt. College (Autonomous), Mandya, Dr. V. Harish, Govt. First Grade College, Shivamogga, Dr. N. G. Shivaprasad, Govt. First Grade College, Srirangapatna, University of Mysore, Mysuru, Dr. Gladys Mathews, Govt. Science College (Autonomous) Bangalore University, Bengaluru and Prof. N. Nagaiah, Bangalore University, Bengaluru.

Local Organising Committee had Prof. H. N. Ramesh, Vice Chancellor, Bangalore University, Bengaluru as the Chairman, Prof. N. Nagaiah, the Convener, Dr. Kamsati Nagaraja, the Local organizing Secretary, Ms. M.R. Ambika and Mr. M. B. Karthik Kumar as Student Organisers. Faculty members and Ph.D students of the Department of Physics were Members of the local organising committee who constituted the Reception Committee, Stage Decoration Committee, Technical Committee, Food Committee and Accommodation/Travel Committee.

Technical Programme of NCRP 2017 consisted of 11 invited talks, spread over 6 different sessions during 23-24 November 2017. There were a total of 71 contributed research papers, out of which 21
were selected for oral presentation and 50 were selected for poster presentation. The research papers were suitably classified into 7 technical themes:

Application of Radiation & Radioisotopes (ARR)
Environmental Radioactivity Measurements (ERM)
Material Processing with Radiation (MPR)
Application of Radiations in Space Sciences (RASS)
Radiation Detection & Measurement (RDM)
Radiation Effects on Materials (REM)
Radiation Protection and Dosimetry (RPD)

Inauguration of NCRP 2017

The two day National Conference on Radiation Physics NCRP 2017 got an illuminating start with the inaugural function on 23 November 2017 at 10.00 AM at the Venkatagiri Gowda Auditorium, Jnanabharathi Campus, Bangalore University, Bengaluru. Ms. M. R. Ambika (student convener) compered the program. The inaugural function started with auspicious lamp lighting and a melodious invocation on Lord Ganesha rendered by Prof. M. K. Kokila and Ms. Mahathi. A documentary on the Department of Physics (prepared by the Department of Electronic Media, BUB) was shown, which highlighted the activities of the Physics Department, BUB. In his welcome address Prof. N. Nagaiah, the convener of NCRP-2017, welcomed the President Prof. H. N. Ramesh, Vice Chancellor, Bangalore University, chief guests Dr. M. R. Iyer, Ex-BARC, Mumbai, Shri L. K. Nanda, Director, AMD, Hyderabad, guests of honour Prof. K. Siddappa, Former Vice Chancellor of Bangalore University, Prof. P. Venkataramaiah, Former Vice Chancellor of Kuvempu University, Prof. B. K. Ravi, Registrar of Bangalore University, Invited speakers and all the contributors/participants. He explained the interdisciplinary importance of the theme radiation physics and said NCRP 2017 has received very good response and contributions from researchers of Universities, AMD, ISRO, IITs at the National level. Prof. Nagaiah thanked the support of Bangalore University, AMD, Bengaluru and all the sponsors. He also acknowledged the help of the entire faculty, Sir M. V. Chair, PG and Ph.D students of the Physics Department in arranging NCRP 2017. Inaugural address by Shri. L. K. Nanda, one of the chief guests, followed after a brief introduction by Dr. V. Harish. In his address Shri L. K. Nanda said radiation physics finds several applications in industrial, medicine, food processing and most importantly in energy sector. He said research in this area often finds obstacles from society because there is a major lack of awareness about the safe use of radiation. He remarked that it is the duty of researchers to educate common man about the benefits of using radiation. Shri L. K. Nanda congratulated Prof. Nagaiah for taking the initiative and organizing NCRP 2017. Inaugural address was followed by the release of the souvenir by the President Prof. H. N. Ramesh and the release of the conference proceedings by the chief guests Dr. M. R. Iyer and Shri L. K. Nanda. In his talk, Dr. M. R. Iyer, fondly recalled that the year 2017 happens to be the centenary year of Dr. A. K. Ganguly of BARC, from whom “radiation physics” owes its origin. He mentioned that the birth of the Indian Society of Radiation Physics in 1976 marks the farsightedness of Dr. A. K Ganguly and Dr. D. V. Gopinath. This led to the formation of the International Radiation Physics Society at Ferrara, Italy in 1985. This formed the backbone of a vibrant and active discipline of radiation physics today. Dr. Iyer expressed that the research activities on Radiation Physics, which were initiated in National Laboratories decades back must now move to the University campus. He appreciated that Universities in Karnataka have taken ahead the “think-tank”of radiation physics research with great interest and have shown the impact of this research area in a meaningful way.
The distinguished Chief Guests Dr. M. R. Iyer, Shri L. K. Nanda and the Guests of honour Prof. K. Siddappa, Prof. P. Venkataramaiah were felicitated by the Vice Chancellor Prof. H. N. Ramesh. Prof. Siddappa addressed the gathering by recalling how radiation physics research had its beginning by him and his group at Mangalore University. He expressed his happiness that his students Dr. N. Karunakara and others have taken the subject area to a different height through their dedicated work. Prof. K. Siddappa appreciated that the quality of students graduated from the Department of Physics, Bangalore University is much higher compared to that from other Universities of Karnataka. He recalled alumni of Department of Physics, Bangalore University, Dr. Pushpalatha Bhat, whose name features in the list of people involved in the epoch making experimental discovery of Higgs particle. He wished that young students from Bangalore University get motivated to take up research in the field of radiation physics.

Prof. P. Venkataramaiah began his speech by mentioning that the genesis of radiation began with the discovery of X-ray by Wilhelm Roentgen, who was awarded the first Nobel Prize in Physics in 1901.
He said the first medical X-ray taken by Wilhelm Rontgen of his wife Anna Bertha Ludwig’s hand was the first of its kind in medical imaging. Prof. Venkataramaiah recalled the good old days when he initiated studies in radiation physics with limited facilities at Mysore University. He said a Single Channel Analyser (SCA) used to take 3 to 4 days to record a full gamma ray spectrum, in contrast to the almost instantaneous recording done using the Multi Channel Analyser (MCA) today. Prof. Venkataramaiah also elaborated about how he and his research group started working on environmental radioactivity at Mysore, with an intention of creating awareness on the importance and safe use of radioactivity amongst environmental activists as well as common man of the society.

In his presidential address, Prof. H. N. Ramesh, Vice Chancellor, Bangalore University, expressed appreciation that the Department of Physics, being one of the oldest departments, has established its credentials in terms of high quality teaching and research. He wished that the Physics Department also takes up consultancy work in future years. Prof. Ramesh said the present conference on radiation physics covers wide areas from very basic to highly intense level and this provides a useful forum enabling interaction between researchers from different parts of the country. Vote of thanks was given by Prof. Vijayakumar H. Doddamani. The inaugural session ended with the National Anthem.

Technical Program, 23 November 2017

Session 1 of NCRP 2017 started with the Key Note Address “Radiation Physics – Yesterday, Today and Tomorrow” by Dr. M. R. Iyer. He spoke about the contributions of Dr. D. V. Gopinath and his school in BARC & IGCAR towards radiation transport theory. Side by side development on Monte Carlo methodology by Dr. P.K. Sarkar and others in BARC came up with how a variance reduction technique (developed by) could reduce statistical uncertainty. Dr. Ganguly, who had used Monte Carlo method in his “Ganguly Magee theory” in Radiation Chemistry in 1956 encouraged both the groups, one working on analytical methods and another on Monte Carlo approach. Dr. Iyer gave a bird’s eye view of how experimental radiation physics perfected methods for neutron spectrum measurements and how theoretical and experimental work developed hand-in-hand. He elaborated on the Physics of thermo-luminescence developed at BARC during last century, development of detectors, use of electrets for radiation monitoring, fission physics and so on, as several landmark developments in radiation physics. He said there are several exciting problems that comes under the subject of Radiation Physics today which are worth pursuing: high energy photon dose measurements, new concepts of detectors like nano detectors employing nano capacitors, neutrino investigations, investigations on the source of thorium deposits in the west coast of India were some of the topics he listed. He said Universities have a great role in sustaining radiation physics research.

The speaker Dr. N. Kumar, BARC, Mumbai was introduced by Dr. B. N. Meera. In his invited talk “Fuel for Indian Nuclear Reactors” Dr. Kumar said India’s nuclear power generation aims to make use of thorium which is an abundant resource material in India. He gave an outline on 22 operating power reactors in India and said developing a successful nuclear fuel is one of the important requirements in the nuclear power programme. He added that India has mastered the technology of ceramic fuel for its power reactors and discussed details of its preparation. In particular he explained...
Session 2, the next technical session of the conference started after the lunch break. There were two invited talks in this session. Shri B. N. Dileep of Environmental Survey Laboratory, Health Physics Division, BARC, Kaiga, presented his talk entitled “Impact of Radiation on People & Environment”. Shri Dileep highlighted that radiation is naturally present everywhere and our bodies contain radioactive materials like carbon-14, potassium-40 and so on. It is possible to produce radiation artificially as in medical X-rays and microwaves for cooking. He discussed about deterministic and stochastic radiation effects, mentioning about how high dose for a short period of time could be fatal and in contrast damage due to small doses of radiation for a long duration. He pointed out that the Atomic Energy Regulatory Board (AERB) constituted by the Government of India ensures the use of radiation does not cause undue risk to the health of people and environment. He highlighted the useful applications of radiation in agriculture, healthcare, geology and many other areas.

Second invited talk of Session II on “Applications of Radioisotopes in Medicine and Healthcare” was delivered by Dr. Tarveen Karir, BRIT, BARC, Mumbai. She discussed the usefulness of beta radiation for therapy – in particular for destroying unwanted growth. She explained that nuclear medicine uses radiation to provide information about the functioning of a person’s specific organs, or to treat disease. The thyroid, bones, heart, liver and so many other organs can be easily imaged and hence, disorders in their function is revealed using radiation imaging. Dr. Tarveen Karir also discussed diagnostic radiopharmaceuticals. She said doctors and chemists have identified the chemicals which are absorbed by specific organs. In particular, she explained that the thyroid takes up iodine, while the brain absorbs glucose. Using this, radiopharmasists are able to attach different radio isotopes to different parts. These radioactive substances, which are specific for a particular organ is known as radiopharmaceuticals. In explaining nuclear medicine therapy, Dr. Karir mentioned that Iodine-131 is commonly used to treat thyroid cancer and it is the most successful kind of cancer treatment. She added that Iodine is also useful to treat non-malignant thyroid disorders. Strontium-89 and also some other radioisotopes are useful in relieving cancer-induced bone pain. Dr. Karir gave details on the dosage of radiation delivered during therapy. She explained details of another interesting external radiation procedure (in contrast to the internal radionuclide therapy) used in therapy is called gamma knife radiosurgery. Dr. Karir’s interesting talk triggered several questions from the audience, which she enthusiastically addressed.
Session 3: After a short tea break, technical session 3 began at 4.30 pm. In this session 6 contributed oral presentations of ten minute duration each were delivered. Dr. Rohilla Nathuram, BARC, Mumbai chaired the session. First oral presentation ARR-2 on “Optimization of reagent concentration for radioiodination of rat C-peptide II in development of radioimmunoassay procedure in rats” was delivered by Ms. B. R. Manupriya, Department of Applied Zoology, Mangalore University, Mangalore. Ms. Manupriya explained Chloramine-T method for the preparation of the tracer required for $^{125}$I- rat C-peptide II for radioimmunoassay kits. Second presentation ARR-3 “Determination of X-ray Mass Attenuation Coefficient and Effective Atomic number of Ayurvedic Drug (KassiaBhasma)” was delivered by Ashwini, Department of Physics, Gulbarga University, Kalaburgi. Contributed talk 3 ARR-4 on “A study of alpha ternary fission of $^{252}$Es using various proximity potentials” was given by Ms. N. Sowmya, Govt. College for Women, Kolar. The 4th talk RPD-5 “Evaluation of Gamma Shielding Parameters of Bismuth Oxide Filled Polymer Composites” was delivered by Ms. M. R. Ambika, Department of Physics, BUB. Fifth presentation RPD-4 on “Effective atomic number of polymer blended granite stones for Compton scattering” was delivered by Mr. B. M. Sankarshan, Department of Studies in Physics, University of Mysore, Mysuru. The last talk of the session RPD 2 on “Studies on effect of PbO-Magnetite on Shielding properties of EPDM composites for 662 keV gamma rays” was delivered by Mr. Vinayak A. Kamat, Mangalore University, Mangaluru.

During Session 3 Shri P.K. Sharma, Head, Physics Group, AMD, Hyderabad, presented an invited talk on “Uranium estimation in geological material by radioactive methods”. Shri Sharma explained that the different stages involved in exploring any mineral to its exploitation are time consuming and they are expensive. It is desirable that the detection and estimation of naturally occurring radioactive minerals should be as fast as possible. Radioactive methods like measurement of the alpha, beta, gamma emissions by the radioactive elements offer a cost effective, speedy and provide onsite results. Survey of gamma emission to explore radioactive minerals is preferred in field investigations compared to alpha and beta emissions. Shri. Sharma explained in detail the development of radiometric techniques used in the program of exploring uranium.

Following this invited talk, there was poster presentations by the participants and was evaluated by the panel of judges. With these the technical sessions of day 1 was concluded.

During 7.00 to 8.30 PM a Cultural Program was organized. The cultural program started with a melodiouls Instrumental Music by Ms. Kumuda and group, M.Sc students of the department of Physics, BUB. This was followed by an excellent solo Bharathanatyam performance by Mr. Harsha, an alumni, Department of Physics, BUB. Students of the Department of Performing Arts, BUB performed a colourful HOLI scene. A fusion was presented by the students of Acharya Institutes, Bengaluru. A different twist followed next by the students of the Dept of Performing Arts, BUB, who presented TARANA, a beautiful kathak performance. In another awe inspiring performance, a YAKSHAGANA (traditional theatre form that combines dance, music, dialogue, costume, make-up, and stage techniques with a unique style found in Karnataka and Kerala) on the famous PUNYAKOTI story (a folk tale from Karnataka, about an honest cow Punyakoti and a tiger named Arbhuta) was
enacted by the students of the Dept. of Performing Arts. The participants of NCRP 2017 enjoyed this memorable cultural evening. The cultural program was followed by the Conference Dinner.

Technical Program, 24 November 2017:

Program of the second day of NCRP 2017 began with Session 4 at 9.30 am on 24 November 2017. Prof. R. Damle introduced the invited speaker Dr. M. A. R. Iyengar, Environmental Consultant, Bengaluru (Former Senior Scientist, BARC, Mumbai), and highlighted that after his retirement from BARC, Dr. Iyengar has devoted his R&D efforts in the area of water purification with an aim to improve public and community health aspects. In this context he has brought out a user-friendly gadget for purifying drinking water contaminated with heavy metals like Arsenic, Lead and Radioactivity present in ground waters. This gadget is marketed by M/s Eureka Forbes, a market leader and the makers of Aqua Guard water purifier.

Dr. Iyengar began his invited talk on “Ground waters, with particular reference to radioactivity and toxic metals” by presenting the distribution of water from ocean & sea (97%), snow and ice caps (2%), rivers, lakes, ground water (1%). He mentioned that in 4 buckets of water only one tea spoon is drinkable. He pointed out that the presence of radiation could produce detrimental biological effects. There is a large variation in the amount of background radiation, which depends on regional geological characteristics and altitude. Many natural and artificial radionuclides like potassium, tritium, carbon, radium, uranium, thorium, radon etc., have been found in water. Contaminated drinking water containing alpha emitters in excess (i.e., more than 0.1 Bq per litre) requires to be purified (treated). Dr. Iyengar remarked that Radon level varies at different regions. He said, ground water in Bangalore has more Radon content. But, when water is stored, it escapes to the environment. Dr. Iyengar continued mentioning that another contamination in drinking water is from Arsenic. He recalled the say, “Arsenic is the poison for kings and the king of poisons” and said it is believed that Arsenic poisoning killed Napoleon Bonaparte. Arsenic is highly toxic and it leads to severe health impairment, including premature mortality due to multiple organ failure. Dr. Iyengar said, accepted limit of arsenic content is 0.05 mg/litr. He mentioned that in large parts of West Bengal, U.P and Assam, ground water is found to contain significantly high level of arsenic. He then informed,
Bangladesh is among the worst arsenic affected countries in the world. Several international agencies are presently involved in addressing the issue to resolve the issue of arsenic contamination. In this direction, water purification technologies are important to ensure safe drinking water. Dr. Iyengar said, he has been able to successfully develop an improved heavy metal remediation technology, which can deal efficiently with the toxic metal and radioactivity issues in contaminated water, at the individual household level. The talk evoked several questions and discussions.

Dr. B. Eraiah introduced the next invited speaker Dr. Y. S. Mayya, Department of Chemical Engineering, IIT Mumbai. Dr. Mayya began presenting his work on “Theoretical modelling perspectives in environmental radon and decay product studies” by giving an overview of research on Radon, which progressed at BARC during 1980’s. Then, under Dr. Nambi’s leadership Dr. Mayya started working at BARC on the survey of the environmental radon and thoron levels. He said theoretical and modelling studies have played a major role in advancing the subject of radon metrology. He mentioned some of the examples highlighting the importance of theoretical modelling leading to experimental progress are in the deposition velocity based progeny monitors, flux measurement techniques, Thoron mitigation system for industrial application, automatic instruments developed to measure the radon content. Particularly, development of dosimetric models helped in understanding the origin of radon due to recoil emanation, decay product-aerosol interaction mechanics, environmental transport and application to global circulation modelling. Dr. Mayya said there is a need to develop analytical tools so that newer technological applications in radiation protection and environmental radioactivity studies can be promoted. He indicated that, radon studies open up new avenues for research with enhanced perspectives. This interesting talk attracted several questions and comments.

Invited talk by Dr. M. A. R. Iyengar
Invited talk by Dr. Y. S. Mayya

Followed by two invited talks, there was a session on oral presentation of five contributed papers. Prof. Karunakara, Mangalore University, Mangaluru chaired the session. The first talk ERM-10 on “Spatial distribution of fall-out Cs-137 in the marine environment …” was presented by Mr. B. Vijayakumar of Environmental Survey Laboratory, Kudankulum Nuclear Power Project, Kudankulam, Tamil Nadu. The second oral presentation ERM-2 on “FFT power spectrum of radon activity” was delivered by Mr. K. Charan Kumar, Dept. of Physics, BUB. The third oral presentation ERM-8 on “Study of Radon and radium concentration in ground water from different parts of South Bengaluru city..” was delivered by Ms. C. G. Poojitha, Department of Physics, BMS College of Engineering, Bengaluru. Fourth oral presentation ERM-12 on the “Activity concentration and AACED due to K-40 in some selected medicinal plants” was delivered by Mr. K. Chandrashekara, Dept. of Physics, St. Phelomena College, Puttur. The fifth and the last oral presentation of the session ERM-21 on “Radioactive disequilibrium in Uranium series of core samples from Rasimalai and Pakkanadu areas of Tamil Nadu” was delivered by Ms. V Madhavi Shankar, AMD, Bengaluru.

Session 5 was held at 12 pm after the tea break. Dr. K. Nagaraja introduced the invited speaker Dr. Seetha, Director of Space Science Programme, ISRO HQ, Bengaluru. Dr. Seetha delivered a talk on
“Detection of high energy electromagnetic radiation from space”. She said her talk is different from the various themes of the NCRP 2017 and her work focuses on understanding the Universe through the detection of radiation. She mentioned that the study of cosmos in the optical region started very early. But the technological developments in the present era promote studying the Universe in the wave bands like X ray and gamma rays. This has been made possible with the advent of rockets and satellites. Her talk over viewed how such investigations has changed our perspective of the Universe.

Second invited talk of Session 5 “Mathematical tool for the interpretation of radiological and other data” was presented by Dr. B. K. Bhaumik, Ex-AMD and VECC, Kolkatta. Dr. Bhaumik highlighted the importance of observing the correlation of variables in the geological data on Uranium and other elements. He informed that the radioactivity measurements made by Kerur et. al., in the granites (which are enriched in uranium and thorium) of North Karnataka, showed a correlation of 0.79 and also reveals that a geochemical coherency is maintained. Taking Th/U ratio it is further classified for interpretation.

Oral presentation session had four talks and was chaired by Dr. Seetha. The first talk RASS 3 “X-ray flares and coronal mass ejections (CMEs) during very quiet solar activity conditions of 2009” was presented by Mr. Praveen Kumar, Department of Physics, BUB. Prof. Vijayakumar Doddamani presented the second oral presentation RASS-2 “Long Ultra Violet monitoring IUE observation of MRK478”. Ms. Taru Bhattacharya, AMD, Bengaluru presented RDM-2 “Monte Carlo calculation of the efficiency calibration curve for HPGe detectors”. The last oral presentation of the session RDM-5 “Performance evaluation of sample oxidation system (Pyrolyser) for Carbon-14 determination in environmental matrices” was given by Ms. Renita Shiny D’Souza, Mangalore University, Mangaluru.

Session 6, the final technical session of the two day conference NCRP 2017 was held after the lunch break. The session was chaired by Dr. Basavaraj Angadi, Dept. of Physics, Bangalore University and had the oral presentations of 5 contributory papers. The first talk REM-3 “Neutron attenuation studies with borated polyethylene slabs containing 30% natural boron and its comparison with Hydrogenous materials” was delivered by Mr. D. Venkata Subramanian, IGCAR, Kalpakkam. Next oral presentation REM-5 on “Energy loss and straggling of alpha particles” was delivered by Mr. Mahalesh Devendrappa of Dept. Physics, Gulbarga University, Kalaburgi. Third talk REM-12 “Investigation of gamma radiation effect on bismuth borate glasses doped with europium oxide and silver chloride” was presented by Ms. D. Rajeshree Patwari. Mr. T. M. Pradeep of Dept. of studies in Physics, University of Mysore, Mysuru presented REM-14, “Comparison of 5 MeV proton and 1 MeV electron irradiation on silicon NPN rf power transistors”. The last oral presentation of the session REM-16 on “Beta ray induced optically stimulated luminescence properties of calcium oxide phosphor” was delivered by Mr. D. Prakash, Dept Physics, PES University, Bengaluru.

The oral presentation session was followed by the invited talk “Centre for Advanced Research in Environmental Radioactivity (CARER) – activities, capabilities, and opportunities for collaborative research” by Prof. N. Karunakara, Mangalore University, Mangaluru. Prof. Karunakara recalled that research on radiation physics was initiated at Mangalore University by Prof. Siddappa during 1987 and then developed. The CARER came into existence during 2014 through the financial support of BRNS, DAE and by the technical support of BARC. Professor Karunakara informed, the centre is engaged in frontline research on radioecology and environmental radioactivity in collaboration with BRNS, BARC, IGCAR, Nuclear Power Corporation of India Ltd. and several International laboratories. He highlighted the various state-of-the-art facilities for low level radioactivity measurements available at CARER and also discussed different research works being carried out at present. Dr. iyengar made a remark appreciating the dedicated efforts of Prof. Karunakara towards developing CARER to the present state. The last invited talk of NCRP 2017 on “Societal benefits of atomic and nuclear radiations” was presented by Dr. Rohila Nathuram, Ex-BARC, Mumbai. Dr. Nathuram outlined the broad range of applications of nuclear and atomic radiations. He mentioned that there are artificially produced isotopes which are available for use. Radiation generating equipments, high energy accelerators, nuclear reactors have further boosted the applications of
radiation for benefits of the society. Ionising radiations are accepted now-a-days for irradiating food items so that their shelf-life is preserved by preventing the degenerating spores and bacteria. He highlighted that people should get awareness about the safe use of radiation. Following this invited talk, there was poster presentation session during the tea break.

Valedictory Function of NCRP 2017

The valedictory function started by requesting the chief guest Shri A. K. Bhat, Regional Director, AMD, Bengaluru and the Guest of Honour Prof. Pradeep G Siddeshwar, Director, PMEB, BUB and Prof. N. Nagaiah, Convener of NCRP 2017 to occupy the stage. Prof. B. Rudraswamy welcomed the gathering. Prof. Nagaiah gave a brief report on the two day conference. He expressed happiness about the grand success of NCRP 2017 and said the program indeed proved the interdisciplinary nature of the field as this provided a stage for research contributions from different disciplines. Prof. Nagaiah specially thanked Dr. N. Kumar and Prof. N. Karunakara for their invaluable support and suggestions. He thanked the faculty members, Ph.D and M.Sc students of Dept. of Physics, BUB for their whole hearted support. He said it is because of all this support NCRP 2017 had its grand success.

In the feedback session Dr. Ranjitha Mondal of Department of Geology and Geophysics, IIT Kharagpur appreciated all the arrangements, the illuminating technical sessions and said help was coming from all sides as there were volunteers always there to assist. Dr. Iyer expressed his happiness about the success of NCRP 2017 and said he is glad that Bangalore University has taken an active role in organizing this conference. He said NCRP 2017 covered many branches of the big tree of Radiation Physics; Posters presented in the conference had lot of variety. But there was not enough time for poster sessions, he regretted. Dr. Iyer felt that much attention has to be given to the poster sessions, where young enthusiastic researchers eagerly present their work. He pointed out that it would be better to sketch the thrust research areas, with well-defined goals, for the next five years; conduct such conferences every year. Dr. Iyer expressed that he is pleasantly amazed by the manner in which the faculty and students worked together in the University and took responsibility in making the event successful. Dr. Kumar said, the conference was well attended. He advised the speakers of the oral
presentations not to literally read from the slides. Dr. Kumar appreciated the cultural program was excellent. He thanked all the volunteers for the wonderful hospitality bestowed. After the feedback session, Dr. Meera introduced the chief guest Shri. A. K. Bhat. In his address, Shri A. K. Bhat congratulated the Convener Prof. Nagaiah and the full team for organizing an excellent two day conference on radiation physics. He said the theme is a well thought one, with six relevant sessions. Shri Bhat said the technical sessions would surely have enlightened the participants and expressed that NCRP 2017 would have turned radiation a friendly companion to people at the end of this two day conference. Shri. A. K. Bhat thanked Prof. Nagaiah for associating AMD in the organisation of NCRP 2017.

The prizes for oral presentations and poster presentations were announced by Dr. B. N. Meera:
Oral Presentations: Ms. M. R. Ambika, Department of Physics BUB won the First Best Prize for her oral presentation. Second prize was shared by two scholars: Ms. Rajeshree Patwari, Department of Physics, BUB and Mr. B. M. Sankarshan, Dept. of Studies in Physics, University of Mysore, Mysuru. Third prize was awarded to Mr. Vinayak Kamat of Mangalore University, Mangalore.
Poster Presentations: First prize was awarded to Ms. Rashmi Nayak of Mangalore University, Mangalore; Second Prize to Mr. M. B. Karthik Kumar, Dept of Physics, BUB and the third prize to Mr. C. Athreya, Dept. of Studies in Physics, University of Mysore, Mysuru.

In his address Prof. Pradeep Siddeshwar mentioned that Department of Physics is one of the finest departments of the University. He appreciated that it is no exaggeration to say that Physics Department helped Bangalore University in scoring a good NAAC grade. He appreciated Prof. N. Nagaiah, Chairman of the Department of Physics and the Convener of NCRP 2017 for organizing this conference. Dr. Kamsali Nagaraja offered vote of thanks to all those who contributed to the success of NCRP 2017.