

A Report on National webinar  
**“Recent Advances in Instrumental Analytical techniques:  
Challenges, Solutions and Trends in Geochemical and Environmental Studies”**  
conducted on 18<sup>th</sup> June 2020



**Prof. Y. Srinivasa Rao**  
**Co-ordinator/Convener**

**Organized by**  
**Department of Geology**  
**ADIKAVI NANNAYA UNIVERSITY**  
**RAJAHMUNDRY – 533 296**  
**A.P., INDIA**

June 2020

A Report on National webinar  
**“Recent Advances in Instrumental Analytical techniques:  
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1. Introduction

Understanding the geochemical distribution in various layers of earth (i.e., crust, mantle and core) and especially at shallow depths on surface of the earth that too in different environments plays an important role in exploring and utilizing various mineral and rock resources for human utilization. This exploring activities has not only expanded its horizons towards new minerals findings but also brought out advanced utilization for newly emerging electronic devices or instruments. Even for studying the environmental pollution levels by these geochemical elements to be explored further and also to be monitored through advanced instruments utilization.

At present, our research on exploring and determining the chemical elements/isotopes are going on from earth to other planetary bodies (i.e., entire earth and other planets/meteorites/asteroids) to have a holistic view of their presence at one end and at other end for determining their levels of concentration from microgram/gram scale to pictogram/gram scale accuracies. For these demanding advanced applications, the world is looking for knowledge domain experts in instruments development, precise sampling & determination methods, innovative application users of inter-disciplinary or intra-disciplinary.

At this juncture, to make awareness or to enhance the knowledge and to provide a comprehensive exposure to the researchers/faculty/students of earth sciences, environmental sciences, chemical sciences, agriculture and life sciences, I personally requested Dr. Balaram vyasetti, who worked as Emeritus Scientist and chief scientist & head of Geochemistry division in CSIR- NGRI-Hyderabad to provide his valuable presentation of updated and concise guide of information on this topic.

2. Objectives of the Program

- Creating awareness on advanced instrumental analytical techniques to the communities of students, researchers and academicians.
- Exposure to advanced and latest techniques for age determination like zircon geochronological studies

- Providing knowledge on available brands/models of instruments for geochemical analysis
- Providing knowledge on importance of accuracy levels of determination
- Importance of Emerging technique i.e., Raman spectroscopy usage as a powerful geochemical tool.
- Some of the critical issues related to sample collection, preparation, decomposition at the time of analysis and its merits and limitations while using different geochemical applications
- Provide exposure to the miniaturization analytical techniques usage in geochemical, mineral and environmental studies to have a quick decision-making

3. Organized bodies & members: Department of Geology &

<b>Departmental Organizing members</b>	<b>Webinar Organizing members</b>
Dr. KV Swamy, Dept of Geology	M. Srinivasa Rao, Web Master
Dr. KN Ratnam, Dept of Geology	Dr. G. Appa Rao, Asst. Prof
Dr. KS Peter, Dept of Geology	Mrs. DV Teja, Asst. Prof
Dr. K Sudharani, Dept of Geology	Mrs. G. Sunanda, INSPIRE-Fellow
Dr. G. Apparao, Dept of Geology	Sri. MV Raghavulu
Mrs. DV Teja, Dept of Geology	

4. Resource person: Dr. V. Balaram, Former Emeritus Scientist, NGRI-Hyd

5. Brief Bio-data of Resource Person: Dr. V. Balaram, Former Emeritus Scientist, NGRI-Hyd

Dr. Vysetti Balaram (DOB 1st June, 1951) received M.Sc. (1974) and Ph.D. degrees (1979) in Chemistry from the Andhra University, Visakhapatnam. He is Former Emeritus Scientist and Chief Scientist & Head, Geochemistry Division, CSIR - National Geophysical Research Institute (NGRI), Hyderabad- 500 007, India. Dr. V. Balaram is an earth and environmental scientist with a trans-disciplinary academic background. His research areas include trace element geochemistry, marine geochemistry, mineral exploration, spectroscopy and environmental chemistry. He is an expert of ICP-mass spectroscopy (quadrupole, magnetic sector & time-of-flight) and their applications in different areas of earth and environmental sciences. In fact, he introduced ICP-MS as well as MP-AES to the Indian earth and environmental scientist's community in 1987 and 2013 respectively with several publications in international reputed journals. He has over 300 publications in international peer-reviewed journals, with ~ 3800 citations (***h-index 33 & i10-index 96***), about 20 book chapters and guided 5 PhD students, few postdoctoral and hundreds of PG students from different universities across the country.

Dr. Balaram is also recipient of several prestigious national and international awards such as "*National Geoscience Award*" from Government of India, New Delhi (2000), "*S. Narayanaswamy Award*" from Geological Society of India, Bangalore (2010); "*Eminent Mass Spectrometrists Award*" from Indian Society of Mass Spectrometry (ISMAS), Mumbai (2006); "*Mantripragada Gold Medal*" from Indian Society of Applied Geochemists (ISAG), Hyderabad (2006) and **3 Lifetime Achievement Awards for Excellence in Science and Technology** from ISAS-Kerala (2015), Bundelkhand University, Jhansi, UP (2016) and ISMAS, BARC, Mumbai (2019). "*Dr. C. V. Raman Memorial Award*" for science popularization and communications from the Science City of Andhra Pradesh, Amaravati (2019), **Honorary Fellow** of both Telangana and Andhra Pradesh Academies of Sciences. He was also the *Leader of Regional Committee, Central Working Group for India for "International Geochemical Mapping Programme" (IGCP 360)* during 1994-97. He has popularized science by delivering ~ 600 lectures in ~ 230 academic institutions across India and abroad (> 35 countries in all 6 continents) which include world's premier academic institutes such as Oxford University & Cambridge University, UK; Australian National University, Canberra; University of Pretoria, South Africa; Iowa State University & National Institute of Standards and Technology (NIST), US; University of Toronto & University of Windsor, Canada, and University of Campinas, Campinas & Nuclear Energy Research Institute, Sao Paulo, Brazil, during the last over 30 years. He was a consulting scientist for making of educational TV programmes for Indian TV- "*UGC-Country-wide Class Room*" (EFL University, Hyderabad), and delivered a number of popular science talks on radio and TV, and now online to different academic institutions in India. He is also Mentor in 67 DST INSPIRE Science Camps all over India (UP to Tamil Nadu & Gujarat to Odisha) during the last ten years. He spends his time researching the R & D trends not only in the areas of his interest but also in allied areas of S & T, and publishes new ideas.

6. Flyer

**ADIKAVI NANNAYA UNIVERSITY**  
RAJAMAHENDRAVARAM, E.G. Dist. A.P. INDIA

**NATIONAL WEBINAR**  
ON

**Recent Advances in Instrumental Analytical techniques:  
Challenges, Solutions and Trends in Geochemical and Environmental Studies**

**on 18<sup>th</sup> June, 2020, 3.00 PM to 5.00 PM**



**Inaugural Address**  
**Prof. Mokka Jagannadha Rao,**  
Hon'ble Vice Chancellor  
Adikavi Nannaya University



**Invited speaker**  
**Dr. V. Balaram**  
Former Emeritus Scientist &  
Chief Scientist and Head  
Geochemistry Division, NGRI

**OBJECTIVE OF WEBINAR**

This webinar focuses on the recent developments in different instrumental analytical techniques used for geochemical and environmental investigations for accurate determinations of Elemental / Isotopic abundances from percent levels to p.p.m levels in a variety of materials. Some of the important instrumental analytical techniques such as AAS, ICP-AES, recently introduced MP-AES, XRF, INAA, ICP-AES, ICP-MS, ICP-TOF-MS, HR-ICP-MS and MC-ICP-MS which are used for bulk geochemical analysis, will be described in detail with practical examples.

**CONCLUDING REMARKS**

**Prof. B. Ganga Rao,**  
Registrar, ANUR

**Dr. K. Ramaneswari,**  
Principal, UCST, ANUR

**DEPARTMENT MEMBERS**  
Dr. K.V.Swamy, Assistant Professor & Co-ordinator, IQAC  
Dr.K.N.Ratnam, HOD  
Dr.K.S.Peter, Assistant Professor  
Dr.K.Sudha Rani, Assistant Professor  
Dr.S. Venkateswara Rao, Assistant Professor  
Dr.G. Appa Rao, Assistant Professor  
Mrs. D.V. Teja, Assistant Professor

**WEBINAR ORGANIZING MEMBERS**  
Sri. M.Srinivasa Rao, Web Master  
Dr.G.Appa Rao, Assistant Professor  
Mrs. D.V. Teja, Assistant Professor  
Mrs.G. Sunanda, Inspire-Fellow  
Sri. M.V.Raghavulu

Mode of  
Delivery  
**ZOOM**  
meeting

Registration  
**Free**

Click  
here



**Registration:**  
<https://forms.gle/8ga7A6tqk JrNMrJG9>

**E-Certificate will be issued on completion  
of the feedback form at the end of the program**

**Convener of the Webinar**  
**Prof. Y. Srinivasa Rao**  
Professor of Geology & Dean-Academic Affairs  
yammani@gmail.com; 9440801165

7. Program Sheet:

**NATIONAL WEBINAR**  
**Recent Advances in Instrumental Analytical Techniques:**  
**Challenges, Solutions and Trends in Geochemical and Environmental Studies**  
18<sup>th</sup> June 2020 (3PM to 5.45 PM)

3.00 P. M: Opening remarks by convener of the webinar: **Prof. Y. Srinivasa Rao**

3.10 P.M.: Introducing our Hon'ble Vice-chancellor: **Dr. K. Nooka Ratnam**

3.15 P.M.: Inaugural address by Hon'ble Vice Chancellor: **Prof. Mokka Jagannadharao**

3.25 P.M.: Introducing our webinar speaker: **Dr. KV Swamy**

3.30 P.M: Speech starts: **Dr. V. Balaram**

**5.00 PM: Questions from Participants**

5.10 PM: Valedictory remarks: **Prof. Ganga rao, Registrar**

5.20 PM: Valedictory remarks: **Dr. Ramaneswari**, Principal, UCST

5.30 PM: Vote of thanks: **Prof. Y. Srinivasa Rao**, Convener of Webinar

8. Webinar Abstract:

The webinar, a practical updated and concise guide for geochemical and environmental analysis, focussed on the recent developments in different instrumental analytical techniques used for geochemical and environmental investigations for accurate determinations of elemental/isotopic abundances from per cent levels to pg/g levels in a variety of materials. Some of the important instrumental analytical techniques such as AAS, ICP-AES, recently introduced MP-AES, XRF, INAA, ICP-AES, ICP-MS, ICP-TOF-MS, HR-ICP-MS and MC-ICP-MS which are used for bulk geochemical analysis, will be described in detail with practical examples. Recently emerged multi-collector technology in combination with collision/reaction cell is allowing to study small variations in natural stable isotopic composition of non-traditional stable isotopes of elements such as V, Cu and Mg which are useful as powerful tracers in geosciences. Developments in SHRIMP opened up zircon geochronology and has revolutionized age dating of rocks by *in-situ* isotopic analysis on single mineral grains such as zircons. Advancements in other micro-analytical techniques such as LA-ICP-MS, EPMA, SEM-EDS, LIBS, have markedly improved direct solid analysis, *in-situ* probing of individual minerals, fluids, and melt inclusions. Raman spectroscopy is currently emerging as a

powerful geochemical tool. Some of the critical areas such as sample collection, sample preparation, sample decomposition, geochemical reference materials, quality issues in general, and the merits and the limitations of individual analytical techniques for different geochemical applications are also discussed. Some remarkable combinations such as LIBS coupled to ICP-MS, and ICP-AES and ICP-MS in a single instrument are doing wonders with outstanding improvements in the analytical performance in recent times. Miniaturization is perhaps the most notable current trend in analytical techniques, and their use in geochemical, mineral exploration and environmental studies allows quick decision-making and provides near-real time sampling guidance in the field where ‘*fit for purpose*’ data on suitable pathfinders and lithologically controlled elements can be valuable.

9. Number of participants: More than 1200 participants registered for participation in the webinar. Very limited i.e., 200 participants have been provided access through zoom link, but all the participants have been provided access through live-youtube streaming link.
10. Publications of the Seminar/Conference: **Youtube webinar on internet.**
11. External funding: Nil, University has funded Rs. 10,000/-. The details of payments made are given below: The remaining balance of Rs. 8000/- is returned to the university.

Particulars	Paid amount in Rs.
Payment of Honorarium to the speaker	2000.00
Payment for brochure and certificate preparation	500.00
Total	2500.00

12. Outcome of the Event:

The completed webinar has provided a light of knowledge of awareness to the youngsters and advanced analytical techniques usage, its availability for various levels of explorations of monitoring studies in earth sciences, life sciences, environmental studies, agricultural studies and also given a scope to enhance determination skills to chemical science researchers. The participants got awareness on lab and field analytical and instrumental methods used in geochemical studies starting from high accuracy instruments usage and till the latest advanced portable field instruments usage in earth and environmental materials study.

13. Feedback Report: Some of whatsapp feedback messages received:

<p>Sir, it was an excellent coverage of studying deep down into the earth and oceans to deep space using so many instrumental methods in the laboratory. I have seen such a vast coverage for the first time. Convey my congrats to AKNU team for such an excellent webinar. -with best regards - Nataraju, BARC, Mumbai</p>
<p>Balaram Ngri: Congrats! Balaram Garu, it was a super hit. Gr8 presentation covering the entire world of Analytical geochemistry. Very well delivered. Dr. Pulak Mukherjee, WIHG, Dehradun</p>
<p>Good evening sir, Myself Mangarajarao Bevara, Presently working as a Geologist in Geological survey of India, Jaipur. Previously I am worked under VVS Gurunatha Rao sir. EEG group NGRI. Today I am participatined Webnier arranged by AKNU. Your lecture is so informative and explain each and every thing is understandable manner and it will help for our future projects taken up in future. Thank you sir.</p>
<p>Nice presentation Sir. The mention of VC that "because you were there, we were able to carry forward our research" is nothing less than a noble prize. That's the impact, and we are trying to carry forward with the team here at NGRI. Thank you Sir</p>
<p>Dear Dr. Balram Garu, Good evening, participated in today's Webinar of ANU. Your lecture is very informative, inspiring &amp; very useful to the geochemists and environmental scientists. Kindly share your presentation copy if possible which will be useful to me &amp; my research scholars. Prof. V. Sudarshan, Department of Applied Geochemistry, OU. Mail id: <a href="mailto:drvsudarshan@yahoo.com">drvsudarshan@yahoo.com</a>; Regards &amp; stay safe</p>
<p>Dear Sirs, Thanks for delivering an excellent, exhaustive and informative presentation covering almost every aspect of geochemistry. I really enjoyed your talk and I can assure that your presentation was very informative and would prove beneficial for the youngsters. I would also like to CONGRATULATE Prof. Yammani Srinivasa Rao who came up with this wonderful idea of organizing a webinar on such an interesting topic and an outstanding speaker. It has made our lockdown period fruitful. Some of the new and exciting things that I learned from your presentation are LIBS and MP-AES techniques (had never heard of it before), availability of several instruments in portable forms, and per-concentration technique for PGE analysis (fire assay). You made the presentation even more interesting by adding several slides giving background information (e.g., the lady activist who protested against high levels of Cr, and your personal experiences as well). I just have query related to planetary explorations/analysis: Your presentation indicated that many techniques including XRF spectrometry and LIBS are used to obtain the chemical record of the planetary soils - I would like to know how is the data for different types of samples are calibrated in those instruments? Is calibration done before each measurement or some other protocol is followed? Once again thank you for the excellent talk. Sincerely yours, IFTIKHAR AHMAD (Ph.D.), Assistant Professor, Department of Geology, Aligarh Muslim University, Aligarh-202002, U.P. (India)</p>

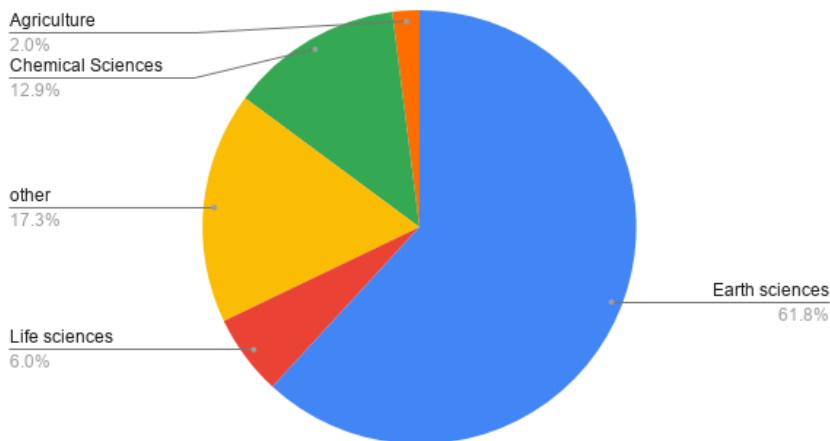


More than 250 participants have given their feedback in the prescribed proforma. The details of the feedback form are given below:

### Subject of participants

(62% of the participants are from earth sciences, 12% are from Chemical sciences)

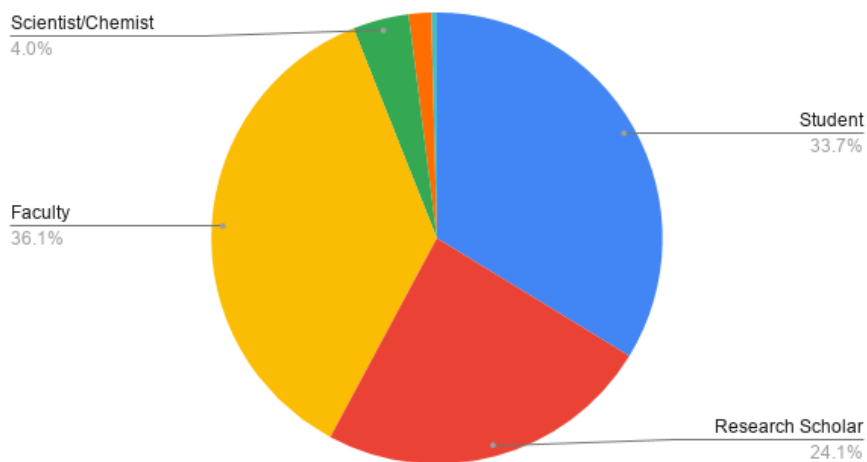
Count of Subject



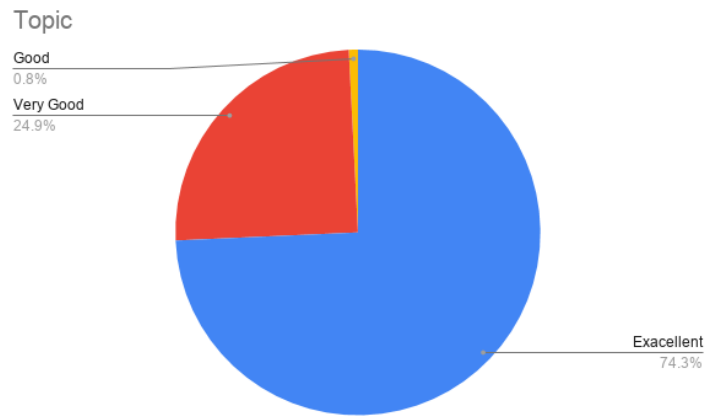
### Designation/levels of participants

(36% of the participants are faculty, 34% are students, 25% are research scholars)

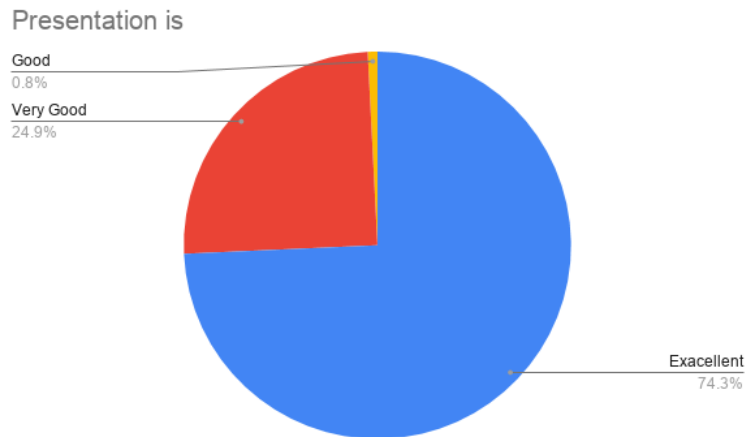
Designation



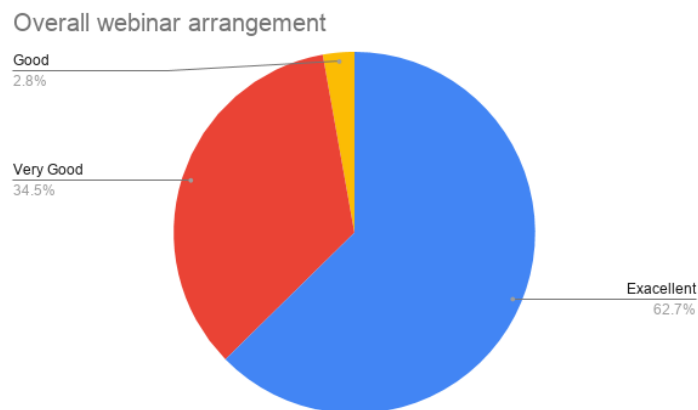
**Response of participants on Topic  
(74% of the participants expressed the topic so excellent)**



**Response of participants on the presentation of topic  
(74% of the participants expressed as excellent of the way of presentation)**



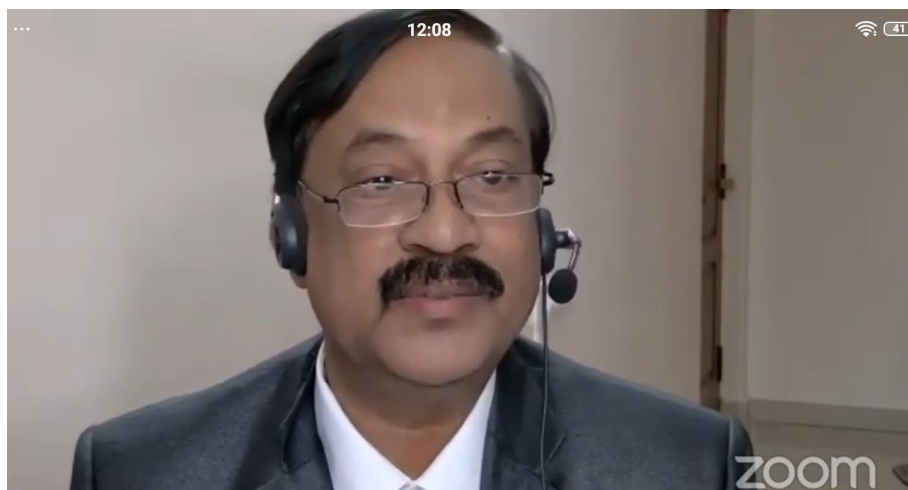
**Response of participants on the overall webinar arrangement  
(63% of the participants expressed as excellent on the overall webinar arrangement)**



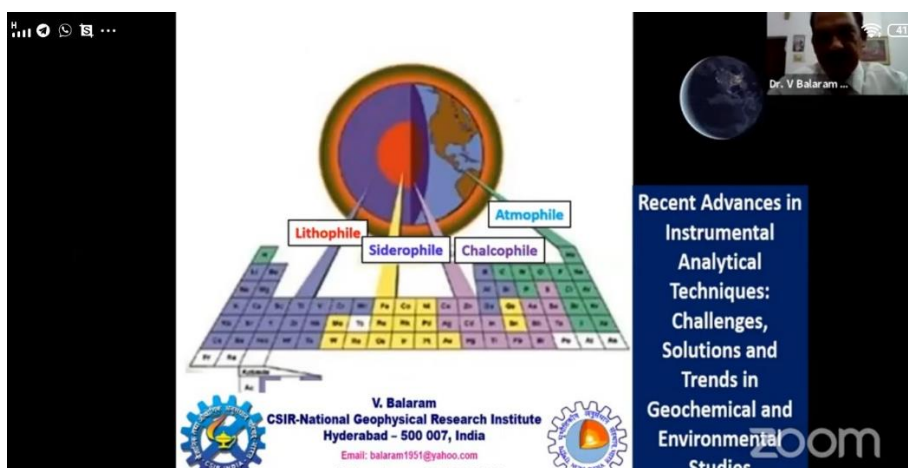
14. e-Certificate: Participation e-certificates have been given in on-line itself immediately after completion of the webinar. The model of e-Certificate is given below:



15. Photo Gallery with captions and Paper clippings



Opening remarks by Webinar Chief Guest & Hon'ble Vice Chancellor **Prof. M. Jagannadha Rao**




Explaining the Geochemical classification of Chemical elements by the Invited Speaker: **Dr. V. Balaram garu**




Explaining the secret of Zircon preservation and its importance by the speaker: **Dr. V. Balaram garu**

# RAMAN SPECTROSCOPY

Raman was the first Asian to Win



1888-1970




On March 31, 1928, *Nature* published a letter from CV Raman, titled "A new type of secondary radiation."

**Raman Effect first observed in 1928**

A change of wavelength exhibited by some of the radiation scattered in a medium. The effect is specific to the molecules which cause it, and so can be used in spectroscopic analysis.

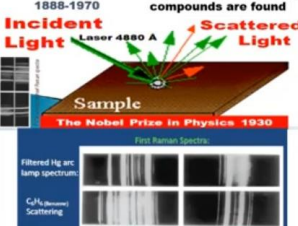
It relies on inelastic scattering, or Raman scattering, of monochromatic light, usually from a laser in the visible, near infrared, or near ultraviolet range.



Dr. V Balaram ...

**Raman Spectroscopy analysis is used to identify the molecular forms in which the compounds are found**

- The laser light interacts with molecular vibrations, phonons or other excitations in the system, resulting in the energy of the laser photons being shifted up or down. The shift in energy gives information about the vibrational modes in the system.
- Infrared spectroscopy yields similar, but complementary



Incident Light Laser 4880 A

Scattered Light

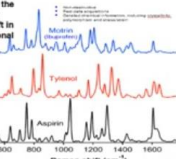
Sample

The Nobel Prize in Physics 1930

First Raman Scattering

Filtered Hg arc lamp spectrum

C<sub>60</sub> Raman Scattering



Aspirin

Tylenol

Raman shift (cm<sup>-1</sup>)


Raman spectra are molecule-specific. Spectra contain information about vibrational modes of the molecule and have sharp features, allowing identification of the molecule

Dr. V Balaram Explaining Raman Effect

Explaining the Raman Spectroscopy by the invited speaker

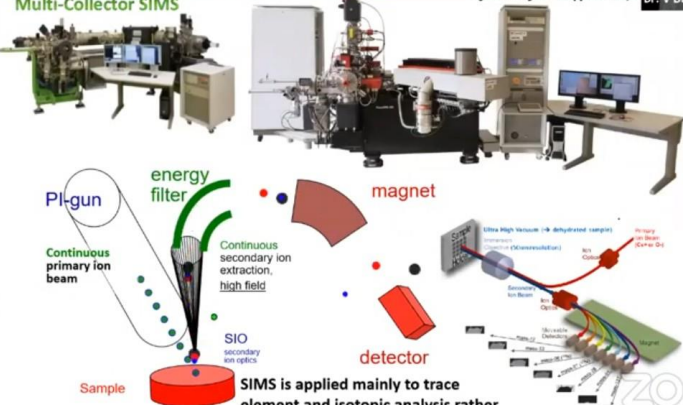
# Magnetic Sector SIMS

By courtesy of Philippe Saliot, C



Dr. V Balaram ...

**Multi-Collector SIMS**



PI-gun

energy filter

magnet

detector


Sample

SIMS is applied mainly to trace element and isotopic analysis rather

Explaining the application of SIMS to trace elements and isotopic analysis

# Multi-Collector Thermal Ionization Mass Spectrometer (TIMS)

TRITON, ThermoFisher




Dr. V Balaram ...

**For terrestrial systems, common applications in geochronology and tracer studies involve the following radiometric systems:**

- U-Th-Pb**
- Rb-Sr**
- Sm-Nd**
- Lu-Hf**
- Re-Os**

**U series disequilibrium**  
Sr, Nd, Hf, Os in seawater



TRITON, ThermoFisher

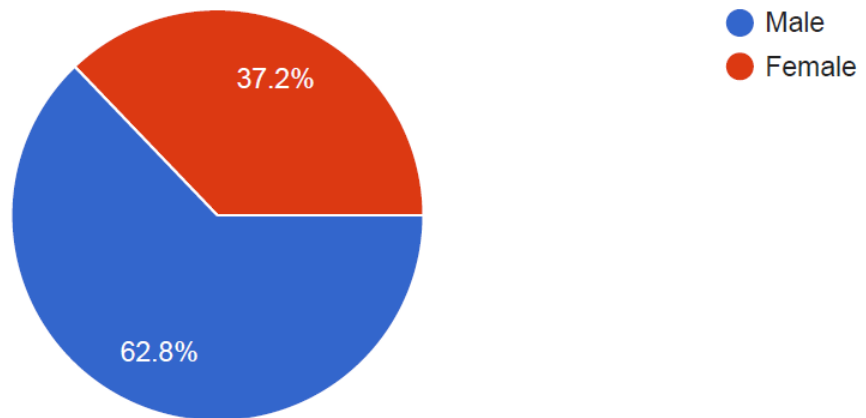
- Schoene et, al (2009) have reported an interesting study on the U-Pb geochronology with trace element geochemical studies on the ca. 40-30 Ma Adamello batholith, North Italy
- Significant differences in REE patterns between zircons from different pulses of magma and also within single samples
- Ce/Ce\* and Eu/Eu\* in these zircons were used to track the oxidation of different parts of magmatic system as a function of time and to identify the changing role of plagioclase fraction in an evolving magmatic system

Briefing on radiometric systems by the speaker

16. List of participants from representing various universities are given below:  
Participants are from Kashmir to Kanayakumari and Bombay to Assam covering the central universities, IITs, CSIR institutions till degree colleges. There are few participants from abroad also.

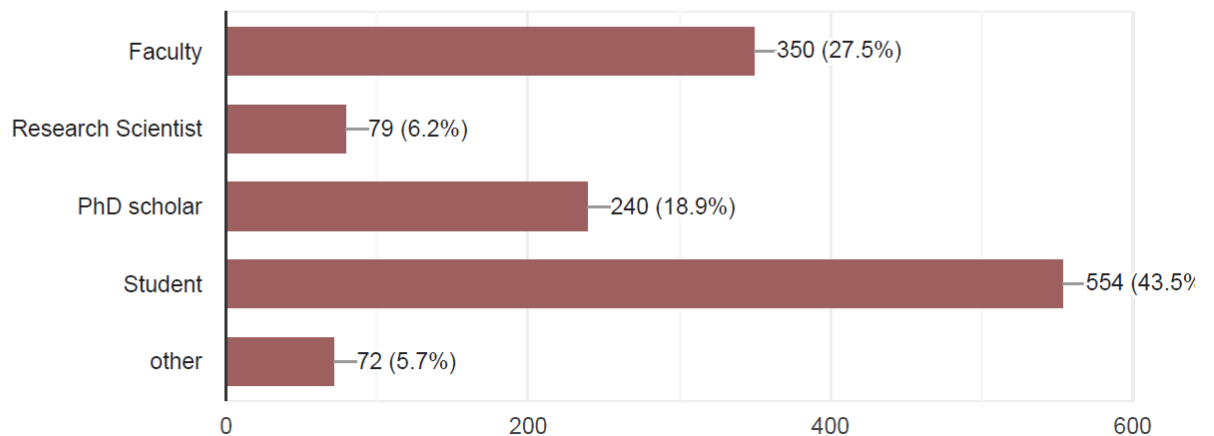
### Gender

1,273 responses



### Occupation

1,273 responses



### List of institutions represented by the participants:

- A.P.S. University Rewa Madhya Pradesh
- Aadikavi nannaya university
- AcSIR-National Geophysical Research Institute(NGRI)
- Aditya College of Engineering and Technology
- ADM COLLEGE FOR WOMEN
- Alagappa University
- Aligarh Muslim University
- Allahabad University Prayagraj
- Andhra Pradesh Space Applications Centre
- Andhra University
- Anna university
- Annamalai University
- Annamalai University-Departent Of Earth Sciences
- Assam University Silchar
- Assam University Silchar
- Azim Premji Foudnation
- B.N. University
- Baba Bhairabananda (Autonomous) Mahavidyalaya,Chandilhole
- BABA Institute of Technology and Science
- Baba Saheb Bhimrao Ambedkar University
- Babasaheb Bhimrao Ambedkar (A Central) University, Lucknow
- Banaras Hindu University
- BARC
- BBAU central university lucknow
- berhampur university
- Bhabha Atomic Research Centre
- Bharathidasan university
- BHU
- Bhundhelkhand university jhansi
- Bipin Bihari Degree College Jhansi
- Birbal Sahni Institute of Palaeosciences
- BIT Mesra
- BR ambedkar national insitute of technology
- Buldelkhand University Jhansi U.P.
- Bureau Veritas
- CALICUT UNIVERSITY- DEPARTMENT OF APPLIED GEOLOGY
- Capgemini Technology Services India Limited
- CBLU Bhiwani Haryana
- CCSU
- Central Ground Water Board
- Central University Jammu
- CENTRAL UNIVERSITY of JHARKHAND RANCHI
- Central University of Kerala
- Central University of Punjab, Bathinda
- Central University of Sikkim
- Centurion University, Andhra Pradesh
- CGWB
- CHAITANYA DEEMED TO BE UNIVERSITY
- Chalapathi Institute of Technology
- Chinmaya Degree College
- Chitkara University
- Choudhary Bansilal University
- Cluster University
- Cluster University Srinagar
- Cluster University Srinagar Kashmir
- Coastal mining consultancy
- COFS
- College of fisheries science (CCSHAU) hisar
- College of Fisheries, Junagadh Agricultural University
- College Of Fishery Science,JABALPUR
- Cotton University
- CSIR IMMT
- CSIR- National Institute of Oceanography
- CSIR- National Physical Laboratory
- CSIR- North East Institute of Science and Technology

- CSIR-CENTRAL INSTITUTE OF MINTING AND FUEL RESEARCH.BILASPUR (C.G.)
- CSIR-IICT
- CSIR-Institute of Minerals and Materials Technology
- CSIR-National Geophysical Research Institute
- CSIR-NGRI
- CSIR-NGRI
- Csjm university
- CUSAT
- Cyient Limited
- D D N Bhole college Bhusawal dist Jalgaon Maharashtra
- D S College, Aligarh
- Dayalbagh Educational Institute Dayalbagh Agra
- DBF Dayanand College Of Arts And Science
- Delhi university
- Department of Geology, Govt. Degree College, Pulwama, Kashmir
- Dev Indrawati P G college Katehari Ambedkar Nagar
- Dibrugarh University
- DMT Consulting Pvt Ltd
- Dnyanprassarak Mandal's College and Research Centre
- Dr B R Ambedkar National Institute of Technology, Jalandhar
- Dr BR Ambedkar National Institute of Technology Jalandhar
- Dr BR Ambedkar university
- Dr BRAU,SRIKAKULAM
- Dr Harisingh Singh Gour Central University
- Dr palpu College of arts and sciences
- Dr. B. R. Ambedkar National institute of technology jalandhar
- Dr. B. R. Ambedkar National Institute of Technology Jalandhar
- Dr. B. R. Ambedkar University
- Dr. B. R. Ambedkar University, Srikakulam
- Dr. B.R. Ambedkar National Institute of Technology
- Dr. Bhimrao Ambedkar University, IBS, Khandari
- Dr. C.V. Raman University, Khandwa M.P
- Dr. Harisingh Gour University
- Dr. Lankapalli Bullayya college
- DR. R M L AVADH UNIVERSITY
- Dr. Reddys Laboratories Ltd
- Dr.B.R.Ambedkar University
- Dr.B.R.Ambedkar University
- Dr.Basaheb Ambedkar Marathwada University
- EKASHILA GROUP OF INSTITUTIONS
- Fergusson College Autonomous, Pune
- Galgotias College of Engineering and Technology
- Gandhgigram Rural Institute.
- GANDHI ACADEMY OF TECHNICAL EDUCATION
- Gandhi Degree College, Orai, District-Jalaun UP
- Gauhati University
- Gauhati University
- Gayatri Vidya Parishad College For Degree And Pg Courses(A)
- Geetanjali medical collage and hospital
- Gems Arts and Science college
- Geological Survey of India
- Geological Survey of India, Central Region
- Geological Survey of India, SU: TN&P
- GGSIPU, Dwaraka- Delhi
- GNDU AMRITSAR
- GNITC
- Goa University
- Graphic era hill university
- Graphic Era Hill University, Dehradun
- Graphic Era University
- GRIET
- Ground water And Water Audit Department
- GSI
- GUIDE



- Gujarat Institute of Desert Ecology
- Gujarat institute of Desert ecology
- Guru Gobind Singh Indraprastha University, Sector 16-C, Dwarka, New Delhi-110078
- GURU NANAK DEV UNIVERSITY
- Guru Nanak Dev University Amritsar
- Guru Nanak Institutions of technical campus (GNITC)
- Gurunanak university
- Hemvati Nandan Bahuguna Garwal University shrinagar Uttarakhand (A Central University)
- Himachal Pradesh University Shimla
- Hindu college
- HLM college Ghaziabad
- Holkar Science College
- HOLY CHILD PUBLIC SCHOOL
- I.p.s academy
- i.t.h.m
- IASE
- IET, Bundelkhand University, Jhansi
- IICT
- IISER Bhopal
- IIT Bhubaneswar
- IIT Dhanbad
- IIT ISM, Dhanbad
- IIT KANPUR
- IIT Kanpur
- IIT Kanpur
- IIT(ISM)
- IITISM DHANBAD
- IMMT
- INDIAN BUREAU OF MINES
- Indian Institute of Geomagnetism
- Indian Institute of Technology (IIT), Guwahati
- Indian Institute of Technology (Indian school of mines) Dhanbad
- Indian Institute of Technology Kharagpur
- Indian navy
- Indian oil R&D
- Indian Veterinary Research Institute,Izatnagar-243122
- Indira Gandhi National Tribal University Amarkantak (A Central University)
- Institute of advanced studies in education IASE Srinagar
- Institute of Agriculture, AEC&RI, TNAU, Kumulur, Trichy
- Institute of Agriculture, Kumulur
- Institute of education BU jhansi
- Institute of hydrocarbons energy and GEORESOURCES ongc center of advanced studies
- Institute of Pharmacy
- INSTITUTE OF PHARMACY, Bundelkhand University
- Institute of Science Laboratory & Education, IPS Academy, Indore
- Institute of seismological Research
- Institution of Engineers, India
- Inter university accelerator centre
- Inter-University Accelerator Centre
- IPS Academy
- IPS Academy Indore
- IPS ACADEMY, INDORE
- ISLE ,IPS Academy
- IUAC, New Delhi
- Jadavpur University
- Jai Narain University
- Jai Narayan Vyas University
- Jamia Millia Islamia
- Jawaharlal Nehru Technological University, Kakinada
- Jawaharlal Nehru University
- Jiwaji University Gwalior
- **Jncu ballia**
- JNTU University
- Jntu, Kakinada
- Jntua college of Engineering Pulivendula
- JNTUA, College of Engineering, Pulivendula- (Kadapa Dist), A.P
- JNTUK KAKINADA
- Jntuk kakinada
- JNU
- JSS ACADEMY OF HIGHER EDUCATION AND RESEARCH
- K.S.K.V Kachchh University

- K.U.F.O.S
- Kachchh University
- Kakatiya university
- Kakatiya University Warangal
- kANNUR UNIVERSITY
- Kanya Maha Vidyalaya, jalandhar
- Karnatak University, Dharwad, Karnataka
- Kashipur Michael Madhusudan Mahavidyalaya
- Kashmir University
- Kendriya Vidyalaya
- Kerala State Disaster Management Authority
- Kerala University of Fisheries and Ocean Studies, Kochi, Kerala
- Khallikote autonomous college
- KHALLIKOTE AUTONOMOUS COLLEGE
- Khallikote University
- KLEIT
- Krishna University
- Krukshetra University krukshetra
- KSKV Kachchh University, Bhuj
- KUFOS
- Kumaun University Nainital
- Kurukshetra University Kurukshetra
- Kurukshetra university kurukshetra haryana
- Kuvempu University, Karnataka
- **L&t**
- LAKIREDDY BALI REDDY COLLEGE OF ENGINEERING
- LUCKNOW CHRISTIAN COLLEGE , LUCKNOW
- Lucknow University
- M. S. Ramaiah Institute of Technology
- M.G SCIENCE INSTITUTE
- M.S Ramaiah college of Arts Science and Commerce
- Madhya Pradesh council of science and technology
- Maharani Cluster University
- Mahatma Gandhi Chiyarakoot Gramodaya VishwaVidyalaya Chittrakoot Satna M PUniversity
- Mallareddy Engineering College-A
- Mangalore University-574199
- Manipal institute of technology
- Mata Gujri Mahila Maha Vishwavidyalaya jabalpur madhya pradesh
- MATS University
- MCPI Private Limited
- Medi-Caps University Indore
- MGSU BIKANER
- Mining Consultant
- Mithila Mahila College, Darbhanga ( L. N. Mithila University, Darbhanga )
- Mizoram University, Aizawl
- MJP ROHILKHAND UNIVERSITY BAREILLY UTTER PARDESH
- Mohan lal sukhadiya university , udaipur 313001
- Mohanlal Sukhadiya University ,Udaipur, Rajasthan
- MSPL Limited
- Mysuru Royal Institute of Technology
- N.E.S. Science College, Nanded
- N.K.T.National College of Education for Women
- Nagaland central university
- National Center for Polar and Ocean Research
- National College
- National Institute of Technology
- NATIONAL INSTITUTE OF TECHNOLOGY, RAIPUR
- National Productivity Council
- NATIONAL SANSKRIT UNIVERSITY
- NAVODAYA VIDYALAYA SAMITI (NVS)
- NBKRIST
- Nehru Gram Bharati Deemed To Be University
- NGRI
- NIRM
- NIT jalandhar
- NIT Trichy
- NIT Warangal
- NITW
- NMDC LIMITED

- Noida International university
- Nowrosjee Wadia College, Pune-01
- NRI Institute of Technology
- Orient paper mill
- Osmania University
- OSMANIA UNIVERSITY
- Osmania University UCC and BM
- OSMANIA UNIVERSITY,
- P R GOVT COLLEGE (A)
- Panjab University
- Parvatibai Chowgule College of Arts and Science (Autonomous) Margao Goa
- Patna University
- PERIYAR UNIVERSITY
- Periyar University college of arts and science
- PETROLEAD
- Phonics group of institution, ROORKEE
- Phonics group of institutions, Roorkee
- Phonics group of institutions, Roorkee
- Pollution Control Board Assam
- PONDICHERRY UNIVERSITY
- POONA COLLEGE OF ARTS, SCIENCE AND COMMERCE
- Post Graduate Department of Geology R.T.M.Nagpur University
- Post Graduate Department of Geology R.T.M.Nagpur University
- Praveenya Institute of Marine Engineering and Maritime Studies
- PRESIDENCY COLLEGE
- PRESIDENCY UNIVERSITY
- Presidency University
- PSCMR College of Engineering and Technology
- QIS INSTITUTE OF TECHNOLOGY
- Raj Rishi Bhartrihari Matsya University Alwar Rajasthan 301001
- RAM LAL ANAND COLLEGE DELHI UNIVERSITY
- Ram Lal Anand College University of Delhi
- Rama university
- Ramnarain Ruia Autonomous College
- RANCHI UNIVERSITY
- Rani Channamma University
- Ravenshaw University, Cuttack
- Rbvrr women's college of pharmacy
- **Reliance Industries Ltd**
- RGUKT Srikakulam
- RTM Nagpur University
- RTM NAGPUR UNIVERSITY NAGPUR
- S J Mahavidyalaya Ramaipur Kanpur
- S K R college for women's (rjy)
- S V University
- S. R. T. M. University Nanded
- S.p college Cluster University srinagar
- S.R.K.R. Engineering College
- S.R.K.R.ENGINEERING COLLEGE
- S.R.T.M.U.N
- S.R.T.M.U.Nanded
- SABIC TECHNOLOGY AND RESEARCH
- Sagar Institute of research and Technology Pharmacy Bhopal
- Sai college of education, Mahoba (up)
- Saibaba Art's and Science College Parseoni
- Samrat phritviraj chauhan degree College, Baghpat
- Sanketika Institute of Technology and Management
- Sant gadge baba Amravati University
- Sardar Vallabhbhai Patel University of Agriculture and Technology
- **Schlumberger**
- School of Pharmaceutical Sciences and Technologies JNTUK
- SCSVMV Deemed University
- SDVM, Barhampur
- SGRR University Dehradun Uttrakhand
- Sher-e-Kashmir University of Agricultural Scient & Technology of Kashmir
- Shoolini University
- Shri krishna group of institution, sitapur
- Shyampur Siddheswari Mahavidyalaya

- Sibelco India Minerals Pvt Ltd
- Sikkim Central University
- Sir C R Reddy College (Aided & Autonomous)
- Sir C R Reddy College of Engineering
- Smt. Vidyawati College of Pharmacy, Jhansi
- SR Group of Institutions
- Sreenidhi institute of science and technology
- Sri Aurobindo College (University of Delhi)
- Sri Krishnadevaraya University
- Sri Sathya Sai Gurukulam
- Sri Venkatesa Perumal College of Engineering and Technology
- Sri Venkateswara College of engineering Bengaluru
- Sri Venkateswara University
- Sri Y N College (A)
- SRKR Engineering College, Bhimavaram
- SRTM University
- SRTM University Nanded
- St Joseph University
- St Xavier's College Mumbai
- St. Xavier's college Ranchi
- St.Charles college of Education
- st.josephs college for women(A)
- St.Xaviers College, Mumbai
- Stani Memorial PG College,Rajasthan University
- Swami Ramanand teerth Marathawada university Nanded
- T.M.B.U.BHAGALPUR
- Tamil Nadu Dr. J.Jayalalithaa Fisheries University
- Tamilnadu Agricultural University-Agricultural College and Research Institute-Killikulam
- Taradevi Harakhchand Kankaria Jain College. Kolkata
- Tech-mahendra
- The Gandhigram Rural Institute
- The Maharaja Shayajirao University of Baroda
- TJPS PG COLLEGE
- Torrent Pharmaceutical Limited Baddi Himachal Pradesh
- UCEK, JNTUK, Kakinada
- **Universirty of madrad**
- **Universiti Malaysia Kelantan**
- University of agricultural sciences
- University Of Allahabad
- University of Calcutta
- University of Calicut
- University of Delhi
- University of Hyderabad
- University of Kashmir
- University of kerala
- University of Lagos
- University of Lucknow
- UNIVERSITY OF MADRAS
- University of Mysore
- UNIVERSITY OF RAJASTHAN
- **University Sains Malaysia**
- UTKAL UNIVERSITY, BHUBANESWAR, ODISHA
- V.K.S. University Ara Bihar
- V.O.Chidambaram College, Tuticorin
- V.S.K Degree & P.G College
- Vasavi college of Engineering
- VIBGYOR INSTITUTIONS
- Vikram university
- Vikrama simhapuri University
- VIMSON Group, Goa
- VISAKHA INSTITUTE OF ENGINEERING & TECHNOLOGY
- VSK UNIVERSITY
- Yogi Vemana University