

Dr. Ankush Tukaram Bhaskar

DST-INSPIRE Faculty,

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Research Area: Magnetospheric physics, Radiation belt dynamics, Space Weather, Cosmic rays, Machine learning, Information theory

Academic Qualification

Degree	Year	Details
• Ph.D.	2016	Physics, Thesis Title: “Physical Understanding and Mathematical Modeling of geomagnetic field variations during the disturbed Magnetosphere-ionosphere system”, University of Mumbai, Mumbai, India. Thesis advisor: Dr. Geeta Vichare. Thesis: http://library.iigm.res.in:8080/xmlui/handle/123456789/885
• M. Sc.	2010	Physics (Astronomy and Space Science), Department of Physics, University of Mumbai, India.
• B. Sc.	2008	St. Xavier’s College Mumbai, India
• H.S.C	2005	Patkar College, Mumbai, India
• S.S.S	2003	Utkarsh Mandir, Malad, Mumbai, India.

Professional Background

Designation	Duration	Institution
• DST-INSPIRE Faculty	October 2020– Present	Space Physics Laboratory, VSSC, ISRO, India
• Postdoctoral Fellow	July 2019– June 2020	NASA/Goddard Space Flight Center, USA
• Jack Eddy Postdoctoral Fellow	July 2017– July 2019	NASA/Goddard Space Flight Center, USA
• Visiting Researcher	August 2018	Department of Astronomy and Astrophysics, TIFR, Mumbai, India
• Research Associate	Apr 2016– July 2017	Indian Institute of Geomagnetism, India
• Research Scholar	Oct 2010– Apr 2016	Indian Institute of Geomagnetism, India
• Visiting Research	May 2015– June 2015	NASA/Goddard Space Flight Center, USA

Scholar

- Visiting Research Scholar June 2008– Dec 2008 IIT Mumbai, India

Awards/Honors/Recognitions/Aclamations

- 2021 Invited Guest Editor by Frontiers in Astronomy and Space Sciences Journal for the special issue.
 - 2021 Invited speaker at joint Assembly IAGA - IASPEI, in session "Recent advances in the system level understanding of solar wind–magnetosphere–ionosphere–thermosphere coupling" to be held on Aug 22-27, 2021 in Hyderabad, India.
 - 2021 Delivered tutorial on "Space Weather and citizen science" at the University of Mumbai, during the celebration of national science day.
 - 2021 Delivered invited talk "Dynamic Space Weather" as a part of "Gyan series lectures" organized by the Department of Physics (Autonomous), University of Mumbai.
 - 2021 Delivered invited talk on "Voyage through the Planetary Magnetospheres" as a part of "National Seminar on Astronomy and Climate Change" organized by Department of Physics, Athalye-Sapre-Pitre College (Autonomous), Devrukh, Maharashtra.
 - 2021 Delivered invited talk on " Career in Space Science ", organized by *Indian National Young Academy of Sciences* INYAS/INSA.
 - 2020 Our work "Estimating satellite orbital drag during historical magnetic superstorms" was highlighted on NASA website <https://www.nasa.gov/feature/goddard/2020/solar-superstorms-past-help-nasa-scientists-understand-risks-for-satellites-orbital-drag/>
 - 2020 Our work "An analysis of the Trouvelot's Auroral Drawing on 1/2 March 1872: Plausible Evidence for Recurrent Geomagnetic Storms" was highlighted on AGU Tweeter and Facebook social media accounts https://twitter.com/intent/retweet?tweet_id=1293277269000097798, <https://m.facebook.com/spaceagu/photos/a.568013986628241/3362667560496189/?type=3&source=54>
 - 2019 Awarded DST-INSPIRE Faculty Fellowship 2019 to work at Space Physics Laboratory, VSSC/ISRO. by DEPARTMENT OF SCIENCE AND TECHNOLOGY (DST), GOV. OF INDIA.
 - 2019 Invited member for the Second Jack Eddy Symposium Steering Committee, June 2021, USA.
 - 2017 Awarded Jack Eddy Postdoctoral Fellowship to work at NASA/ Goddard Space Flight Center by NASA-LiViNG WiTH STAR PROGRAM for two years.
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- 2013 Awarded CSIR Travel Grant to present the paper at CWASES II Symposium, Nagoya, Japan, 18-22 November 2013.
 - 2013 Awarded DST Travel Grant to present the paper at CWASES II Symposium, Nagoya, Japan, 18-22 November 2013.
 - 2009 Awarded Indian Academy of Sciences Summer Fellowship to work at National Center for Radio Astrophysics, (NCRA) Pune during M.Sc.
 - 2009 Awarded VSRP NCRA Summer Fellowship to work at National Center for Radio Astrophysics,(NCRA) Pune during M.Sc.
 - 2008 Selected for Summer School at Inter-University Center of Astronomy Astrophysics (IUCAA), Pune, India
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Major additional responsibilities

- Steering committee member for the Second Jack Eddy Symposium, June, 2021 USA
 - Guest Editor by Frontiers in Astronomy and Space Sciences Journal for special issue 2021-2022.
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Fellowship in professional bodies

- Life Member of Astronomical Society of India (ASI)
 - Member of American Geophysical Union (AGU)
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Organization of Conferences/Symposia/workshop

- 2021 The Second Jack Eddy Symposium June, 2021 USA.
 - 2012 One of the Organizing committee members of the workshop "Venus transit" at Western Regional Instrumentation Center, University of Mumbai, India
 - 2011 One of the Organizing committee members of the workshop "Ancient Indian Astronomy and Instrumentation" at Western Regional Instrumentation Center, University of Mumbai, India
 - 2010 One of the Organizing committee members of the workshop "A for Astronomy - Astronomical Observation and Instrumentation", 2-4 December 2010, at Western Regional Instrumentation Center, University of Mumbai, India
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Publications – < Total: 35 >

1. **Bhaskar, A.**, Sibeck, D., Kanekal, S.G., Singer, H.J., Reeves, G., Oliveira, D.M., Kang, S.B. and Komar, C., 2021. Radiation Belt Response to Fast Reverse Shock at Geosynchronous Orbit. *The Astrophysical Journal*, 910(2), p.154.
2. Oliveira, D.M., Hayakawa, H., **Bhaskar, A.**, Zesta, E. and Vichare, G., 2020. A possible case of sporadic aurora observed at Rio de Janeiro. *Earth, Planets and Space*, 72, pp.1-9.
3. Oliveira, D.M., Zesta, E., Hayakawa, H. and **Bhaskar, A.**, 2020. Estimating satellite orbital drag during historical magnetic superstorms. *Space Weather*, 18(11), p.e2020SW002472.
4. Hayakawa, H., Hattori, K., Pevtsov, A.A., Ebihara, Y., Shea, M.A., McCracken, K.G., Daglis, I.A., **Bhaskar, A.**, Ribeiro, P. and Knipp, D.J., 2021. The intensity and evolution of the extreme solar and geomagnetic storms in 1938 January. *The Astrophysical Journal*, 909(2), p.197.
5. Hayakawa, H., Blake, S.P., **Bhaskar, A.**, Hattori, K., Oliveira, D.M. and Ebihara, Y., 2021. The extreme space weather event in 1941 February/March. *The Astrophysical Journal*, 908(2), p.209.
6. Datar, G., Vichare, G., Selvaraj, C., **Bhaskar, A.** and Raghav, A., 2020. Causes of the diurnal variation observed in gamma-ray spectrum using NaI (TI) detector. *Journal of Atmospheric and Solar-Terrestrial Physics*, 207, p.105369.
7. Pai, C., **Bhaskar, A.** and Rawoot, V., 2020. Investigating the dynamics of COVID-19 pandemic in India under lockdown. *Chaos, Solitons & Fractals*, 138, p.109988.
8. **Bhaskar, A.**, Hayakawa, H., Oliveira, D.M., Blake, S., Silverman, S.M. and Ebihara, Y., 2020. An Analysis of Trouvelot's Auroral Drawing on 1/2 March 1872: Plausible Evidence for Recurrent Geomagnetic Storms. *Journal of Geophysical Research: Space Physics*, 125(10), p.e2020JA028227.
9. Hayakawa, H., Ebihara, Y., Pevtsov, A.A., **Bhaskar, A.**, Karachik, N. and Oliveira, D.M., 2020. Intensity and time series of extreme solar-terrestrial storm in 1946 March. *Monthly Notices of the Royal Astronomical Society*, 497(4), pp.5507-5517.
10. Shaikh, Z.I., Raghav, A.N., Vichare, G., **Bhaskar, A.** and Mishra, W., 2020. Comparative statistical study of characteristics of plasma in planar and non-planar ICME sheaths during solar cycles 23 and 24. *Monthly Notices of the Royal Astronomical Society*, 494(2), pp.2498-2508.
11. Raghav, A., Shaikh, Z., Misal, D., Rajan, G., Mishra, W., Kasthurirangan, S., **Bhaskar, A.**, Bijewar, N., Johri, A. and Vichare, G., 2020. Exploring the common origins of the Forbush decrease phenomenon caused by the interplanetary counterpart of coronal mass ejections or corotating interaction regions. *Physical Review D*, 101(6), p.062003.
12. Datar, G., Vichare, G., Raghav, A., **Bhaskar, A.**, Sinha, A.K. and Nair, K.U., 2020. Response of Gamma-Ray Spectrum During Ockhi Cyclone. *Frontiers in Earth Science*, 8, p.15.
13. Hayakawa, H., Ribeiro, P., Vaquero, J.M., Gallego, M.C., Knipp, D.J., Mekhaldi, F., **Bhaskar, A.**, Oliveira, D.M., Notsu, Y., Carrasco, V.M. and Caccavari, A., 2020. The extreme space weather event in 1903 October/November: An outburst from the quiet Sun. *The Astrophysical Journal Letters*, 897(1), p.L10.

14. Shaikh, Z.I., Raghav, A., Vichare, G., **Bhaskar, A.**, Mishra, W. and Chorgha, K., 2019. Concurrent effect of Alfvén waves and planar magnetic structure on geomagnetic storms. *Monthly Notices of the Royal Astronomical Society*, 490(3), pp.3440-3447.
15. **Bhaskar, A.** and Vichare, G., 2019. Forecasting of SYMH and ASYH indices for geomagnetic storms of solar cycle 24 including St. Patrick's day, 2015 storm using NARX neural network. *Journal of Space Weather and Space Climate*, 9, p.A12.
16. Vichare, G., Thomas, N., Shiokawa, K., **Bhaskar, A.** and Sinha, A.K., 2019. Spatial gradients in geomagnetic storm time currents observed by Swarm multispacecraft mission. *Journal of Geophysical Research: Space Physics*, 124(2), pp.982-995.
17. Rudd, J.T., Oliveira, D.M., **Bhaskar, A.** and Halford, A.J., 2019. How do interplanetary shock impact angles control the size of the geoeffective magnetosphere?. *Advances in Space Research*, 63(1), pp.317-326.
18. Shaikh, Z.I., Raghav, A.N., Vichare, G., **Bhaskar, A.** and Mishra, W., 2018. The Identification of a Planar Magnetic Structure within the ICME Shock Sheath and Its influence on Galactic Cosmic-Ray Flux. *The Astrophysical Journal*, 866(2), p.118.
19. Raghav, A.N., Kule, A., **Bhaskar, A.**, Mishra, W., Vichare, G. and Surve, S., 2018. Torsional Alfvén Wave Embedded ICME Magnetic Cloud and Corresponding Geomagnetic Storm. *The Astrophysical Journal*, 860(1), p.26.
20. Vichare, G., **Bhaskar, A.**, Datar, G., Raghav, A., Nair, K.U., Selvaraj, C., Ananthi, M., Sinha, A.K., Paranjape, M., Gawade, T. and Kumar, C.A., 2018. Equatorial secondary cosmic ray observatory to study space weather and terrestrial events. *Advances in Space Research*, 61(10), pp.2555-2568.
21. **Bhaskar, A.**, Ramesh, D.S., Vichare, G., Koganti, T. and Gurubaran, S., 2017. Quantitative assessment of drivers of recent global temperature variability: an information theoretic approach. *Climate Dynamics*, 49(11), pp.3877-3886.
22. Behera, J.K., Sinha, A.K., Vichare, G., **Bhaskar, A.**, Honary, F., Rawat, R. and Singh, R., 2017. Enhancement and modulation of cosmic noise absorption in the afternoon sector at subauroral location (L= 5) during the recovery phase of 17 March 2015 geomagnetic storm. *Journal of Geophysical Research: Space Physics*, 122(9), pp.9528-9544.
23. Raghav, A., Shaikh, Z., **Bhaskar, A.**, Datar, G. and Vichare, G., 2017. Forbush decrease: A new perspective with classification. *Solar Physics*, 292(8), pp.1-14.
24. Shaikh, Z., Raghav, A. and **Bhaskar, A.**, 2017. The presence of turbulent and ordered local structure within the ICME shock-sheath and its contribution to Forbush decrease. *The Astrophysical Journal*, 844(2), p.121.
25. **Bhaskar, A.**, Subramanian, P. and Vichare, G., 2016. Relative contribution of the magnetic field barrier and solar wind speed in ICME-associated Forbush decreases. *The Astrophysical Journal*, 828(2), p.104.
26. Gawali, P., **Bhaskar, A.**, Dhar, A. and Ramesh, D.S., 2016. Science outreach and capacity building in geomagnetism and space sciences—An Indian Institute of Geomagnetism endeavor. *Space Weather*, 14(5), pp.324-329.
27. **Bhaskar, A.**, Vichare, G., Arunbabu, K.P. and Raghav, A., 2016. Role of solar wind speed and interplanetary magnetic field during two-step Forbush decreases caused by Interplanetary Coronal Mass Ejections. *Astrophysics and Space Science*, 361(7), pp.1-13.

28. Vichare, G., **Bhaskar, A.** and Ramesh, D.S., 2016. Are the equatorial electrojet and the Sq coupled systems? Transfer entropy approach. *Advances in Space Research*, 57(9), pp.1859-1870.
29. Panda, S.K., Gedam, S.S., Rajaram, G., Sripathi, S. and **Bhaskar, A.**, 2015. Impact of the 15 January 2010 annular solar eclipse on the equatorial and low latitude ionosphere over the Indian region. *Journal of Atmospheric and Solar-Terrestrial Physics*, 135, pp.181-191.
30. Vichare, G., Rawat, R., **Bhaskar, A.** and Pathan, B.M., 2014. Ionospheric current contribution to the main impulse of a negative sudden impulse. *Earth, Planets and Space*, 66(1), pp.1-21.
31. Raghav, A., **Bhaskar, A.**, Lotekar, A., Vichare, G. and Yadav, V., 2014. Quantitative understanding of Forbush decrease drivers based on shock-only and CME-only models using global signature of February 14, 1978 event. *Journal of Cosmology and Astroparticle Physics*, 2014(10), p.074.
32. Raghav, A., **Bhaskar, A.**, Yadav, V. and Bijewar, N., 2015. Low energy secondary cosmic ray flux (gamma rays) monitoring and its constrains. *Astrophysics and Space Science*, 355(2), pp.347-352.
33. **Bhaskar, A.** and Vichare, G., 2013. Characteristics of penetration electric fields to the equatorial ionosphere during southward and northward IMF turnings. *Journal of Geophysical Research: Space Physics*, 118(7), pp.4696-4709.
34. Raghav, A., **Bhaskar, A.**, Yadav, V., Bijewar, N., Pai, C., Koli, A., Navale, N., Singh, G., Dubey, N., Pawar, S. and Parab, P., 2013. Confirmation of secondary cosmic ray flux enhancement during the total lunar eclipse of 10 December 2011. *Journal of Geophysical Research: Space Physics*, 118(10), pp.6426-6433.
35. **Bhaskar, A.**, Purohit, A., Hemalatha, M., Pai, C., Raghav, A., Gurada, C., Radha, S., Yadav, V., Desai, V., Chitnis, A. and Sarpotdar, P., 2011. A study of secondary cosmic ray flux variation during the annular eclipse of 15 January 2010 at Rameswaram, India. *Astroparticle Physics*, 35(5), pp.223-229.

डॉ. अंकुश तुकाराम भास्कर

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अनुसंधान क्षेत्र

भू-चुंबकीय मंडल भौतिकी, विकिरण बेल्ट गतिकी, अंतरिक्ष मौसम, ब्रह्मांडीय किरणें, मशीन लर्निंग, इनफार्मेशन थेअरी

शैक्षणिक योग्यता

डिग्री	वर्ष	विवरण
• पी एचडी	२०१६	भौतिक विज्ञान; शोधग्रंथ का शीर्षक: "फिजिकल अंडरस्टैंडिंग एंड मैथमेटिकल मॉडलिंग ऑफ़ जोमेग्नेटिक फील्ड वैरिएशंस इड्रिंग डिस्टर्बड मैग्नेटोस्फेर आइनोस्फेर सिस्टम मुंबई विश्वविद्यालय, मुंबई, भारत, थीसिस सलाहकार: डॉ. गीता विचारे. शोधग्रंथ: http://library.iigmr.res.in:8080/xmlui/handle/123456789/885
• एम एससी	२०१०	भौतिकी (खगोल विज्ञान और अंतरिक्ष विज्ञान), भौतिकी विभाग, मुंबई विश्वविद्यालय, भारत.
• बी एससी	२००८	सेंट जेवियर्स कॉलेज मुंबई, भारत
• एच.एस. सी.	२००५	पाटकर कॉलेज, मुंबई, भारत
• एस.एस. सी.	२००३	उत्कर्ष मंदिर, मलाड, मुंबई, भारत

प्रोफेशनल बैकग्राउंड

पद	समयांतराल	संस्थान
• डीएसटी इंस्पायर फैकल्टी	अक्टूबर २०२० - वर्तमान	अंतरिक्ष भौतिकी प्रयोगशाला, वीएसएससी, इसरो, भारत
• पोस्टडॉक्टरल फेलो	जुलाई २०१९- जून २०२०	नासा/गोडार्ड स्पेस फ्लाइट सेंटर, यूएसए

- जैक एडी पोस्टडॉक्टरल फेलो जुलाई २०१७ – जुलाई २०१९ नासा/गोडार्ड स्पेस फ्लाइट सेंटर, यूएसए
- विजिटिंग रेसेअर्चर अगस्त २०१८ खगोल विज्ञान और खगोल भौतिकी विभाग, टीआईएफआर, मुंबई, भारत
- रिसर्च स्कॉलर अक्टूबर २०१०- अप्रैल २०१६ भारतीय भू-चुंबकत्व संस्थान, भारत
- विजिटिंग स्कॉलर रिसर्च मई २०१५ - जून २०१५ नासा/गोडार्ड स्पेस फ्लाइट सेंटर, यूएसए
- विजिटिंग स्कॉलर रिसर्च जून २००८- दिसंबर २००८ आईआईटी मुंबई, भारत

पुरस्कार/सम्मान/स्वीकरण/अभिनंदन

- २०२१ फ्रंटियर्स इन एस्ट्रोनॉमी एंड स्पेस साइंसेज जर्नल द्वारा विशेष अंक के लिए आमंत्रित अतिथि संपादक।
- २२-२७ अगस्त, २०२१ को हैदराबाद, भारत में आयोजित होने वाले सत्र में "सौर पवन-मैग्नेटोस्फीयर-आयनोस्फीयर-थर्मोस्फीयर कपलिंग की सिस्टम स्तर की समझ में हालिया प्रगति" सत्र में २०२१ संयुक्त सभा में आमंत्रित वक्ता।
- २०२१ भौतिकी विभाग (स्वायत्त), मुंबई विश्वविद्यालय द्वारा आयोजित "ज्ञान श्रृंखला व्याख्यान" के एक भाग के रूप में "डायनेमिक स्पेस वेदर" वितरित आमंत्रित वार्ता।
- २०२१ भौतिकी विभाग, अथल्य-सप्रे-पित्रे कॉलेज (स्वायत्त), देवरुख, महाराष्ट्र द्वारा आयोजित "खगोल विज्ञान और जलवायु परिवर्तन पर राष्ट्रीय संगोष्ठी" के एक भाग के रूप में "वाँयेज थू प्लेनेटरी मैग्नेटोस्फेरेस" पर आमंत्रित वार्ता वितरित की।
- २०२१ इंडियन नेशनल यंग एकेडमी ऑफ साइंसेज इन्व्यास/इंसा
- द्वारा आयोजित "कैरियर इन स्पेस साइंस" पर आमंत्रित वार्ता वितरित की।
- २०२० हमारा काम "१/२ मार्च १८७२ को ट्रौवेलॉट्स ऑरोरल ड्रॉइंग का विश्लेषण: आवर्तक भू-चुंबकीय तूफानों के लिए प्रशंसनीय साक्ष्य" को AGU ट्वीटर और फेसबुक सोशल मीडिया अकाउंट्स पर हाइलाइट किया गया था।
- २०२० हमारा काम "ऐतिहासिक चुंबकीय सुपरस्टॉर्म के दौरान उपग्रह कक्षीय ड्रैग का अनुमान" नासा की वेबसाइट पर हाइलाइट किया गया था
<https://www.nasa.gov/feature/goddard/2020/solar-superstorms-past-help-nasa-scientists-understand-risks-for-satellites-orbital-drag/>
- २०१९ को अंतरिक्ष भौतिकी प्रयोगशाला, वीएसएससी/इसरो में काम करने के लिए डीएसटी-इंस्पायर फैकल्टी फेलोशिप से विज्ञान और प्रौद्योगिकी विभाग (डीएसटी), सरकार द्वारा सम्मानित किया गया।
- २०१९ दूसरी जैक एडी संगोष्ठी संचालन समिति, जून, २०२१, यूएसए के लिए आमंत्रित सदस्य।
- २०१७ को दो साल के लिए नासा-लिविंग विद स्टार प्रोग्राम द्वारा नासा/गोडार्ड स्पेस फ्लाइट सेंटर में काम करने के लिए जैक एडी पोस्टडॉक्टरल फेलोशिप से सम्मानित किया गया।

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- २०१३ सीडब्ल्यूएएसईएस ॥ संगोष्ठी, नागोया, जापान, १८-२२ नवंबर २०१३ में पेपर प्रस्तुत करने के लिए सीएसआईआर ट्रेवल ग्रांट से सम्मानित।
 - २०१३ सीडब्ल्यूएएसईएस ॥ संगोष्ठी, नागोया, जापान, १८-२२ नवंबर २०१३ में पेपर प्रस्तुत करने के लिए डीएसटी ट्रेवल ग्रांट से सम्मानित किया गया।
 - २००९ एमएससी के दौरान नेशनल सेंटर फॉर रेडियो एस्ट्रोफिजिक्स (एनसीआरए), पुणे में काम करने के लिए इंडियन एकेडमी ऑफ साइंसेज समर फेलोशिप से सम्मानित।
 - २००९ एमएससी के दौरान नेशनल सेंटर फॉर रेडियो एस्ट्रोफिजिक्स (एनसीआरए), पुणे में काम करने के लिए वीएसआरपी एनसीआरए समर फेलोशिप से सम्मानित।
 - २००८ इंटर यूनिवर्सिटी सेंटर ऑफ एस्ट्रोनॉमी एस्ट्रोफिजिक्स (आईयूसीए), पुणे, भारत में समर स्कूल के लिए चयनित
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प्रमुख अतिरिक्त जिम्मेदारियां

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- दूसरे जैक एडी संगोष्ठी, जून, २०२१, यूएसए, के लिए संचालन समिति के सदस्य।
 - विशेष अंक २०२१-२०२२ के लिए फ्रंटियर्स इन एस्ट्रोनॉमी एंड स्पेस साइंसेज जर्नल द्वारा अतिथि संपादक।
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प्रोफेशनल बोर्डिंग में अध्येतावृत्ति

-
- भारतीय खगोलीय सोसायटी (एएसआई) के आजीवन सदस्य
 - अमेरिकी भूभौतिकीय संघ (AGU) के सदस्य
-

सम्मेलनों/संगोष्ठियों/कार्यशालाओं का आयोजन

-
- २०२१ दूसरी जैक एडी संगोष्ठी, जून, २०२१, यूएसए
 - २०१२ वेस्टर्न रीजनल इंस्ट्रुमेंटेशन सेंटर, मुंबई विश्वविद्यालय, भारत में कार्यशाला "वीनस ट्रांजिट" के आयोजन समिति के सदस्य में से एक
 - २०११ वेस्टर्न रीजनल इंस्ट्रुमेंटेशन सेंटर, मुंबई विश्वविद्यालय, भारत में कार्यशाला "प्राचीन भारतीय खगोल विज्ञान और इंस्ट्रुमेंटेशन" के आयोजन समिति के सदस्यों में से एक
 - २०१० पश्चिमी क्षेत्रीय इंस्ट्रुमेंटेशन सेंटर, मुंबई विश्वविद्यालय, भारत में कार्यशाला "ए फॉर एस्ट्रोनॉमी -
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