



**Prof. Hum Chand**  
Professor

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**Contact Details:**

**Correspondence Present address:**

Department of Physics and Astronomical Sciences,  
Central University of Himachal Pradesh (CUHP),  
Temporary Academic Block, Shahpur,  
Kangra, Himachal Pradesh, India. Pin-176206

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**Permanent Address:**

Vill-Chalauni, Tehsil & PO Karsog  
Distt. Mandi, Himachal Pradesh 175011,  
India

**Academic Qualification:**

MSc,HPU) NET/CSIR-JRF, JEST, PhD (IUCAA), PDF  
(IAU Peter-Gruber fellow IAP Paris/France)

**Positions Held:**

PhD student at IUCAA, (2002-2006), Post-doc  
as IAU PG Fellow (IAP, Paris 2006-2008),  
Scientist at ARIES (2008-2019), now Profesor  
at CUHP

For more detail click at [Positions Held](#).

Also, see for [past job web page at ARIES](#)

**Specialisation:**

Extra-galactic astronomy: Quasars  
absorption lines studies to probe evolution of  
high-z proto-galaxy, cosmology using Lyman-  
alpha forest, cosmological variation of  
fundamental constants using high resolution  
AGN spectroscopy, quasars outflow, AGN  
variability, AGN black hole mass estimations,  
multi-wavelength study of AGNs.

**Research Interest:**

Extra-galactic astronomy: (1) Time and  
space variation of fundamental constants

using very high resolution spectra of QSOs, (2) MgII absorbers as probe of high-z proto-galaxy, viz environment and magnetic field (3) Physical state of IGM using Lyman-alpha forest (4) Multi-wavelength study of AGN viz NLSy1s/BLSy1s (5) AGN variability properties on diverse time scale (iv) Weak emission line QSOs (6) AGN outflow and BAL-QSOs (7) Photometric reverberation mapping and black hole mass measurement of AGN.

**Publications:**

*About 41 refereed papers having 1255 citations and H-Index of 15* ( as of January 2020 based on ADS) and 18 conference papers.

For list Click here on [Refereed Paper](#) and Click here for [Conference Proceeding](#) Publications list

Also, see [ADS list by Click here](#) .

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**Research Projects Completed/Ongoing:**

Completed: 1 (SERB/DST ~19lacs grant)

Ongoing: 2 (SERB/DST about Rs 60 lacs grant)

Click here for [Research Projects](#) list

**M.Phil. Supervised:**

Nil

(However, click here for list of [Project Students supervised](#) Total: 29)

**Ph.D. Supervised:**

Click here for list of [Ph.D. Supervised](#) (Total: 3)

**Ph.D. Supervising:**

Click here for list of [Ph.D. Supervising](#) (Total: 5)

**Participation in Seminars/Conferences:**

Click here for list of [Invited talks](#) (Total: 14) [Contributed talks](#) (Total: 46) and attended

[Conferences/workshop](#) (Total: 29)

**Membership of Learned Societies/ Professional Bodies:** Click here for [Membership](#) list (Total: 6)

**Awards & Honours Received:** Click here for [Awards & Honours Received](#) list (Total: 7)

**Others:** Click for list of [Course Taught](#) (Master: 2 [ongoing], Pre-Phd: 24)

Click here for [Observation Experience](#) ( About in 9 category, using 1-10m class telescope for in India/abroad photometry/imaging and spectroscopy)

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## Membership list

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**6 Editorial member** of the **Journal of Astronomy and Astrophysics**, Jan 2018-present

**5 Indian PI of the 4m-International liquid mirror telescope**, being setup at ARIES (2017-2019)

**4.** Member of the **cosmic magnetic \_filed group of SKA** working groups

**3. Life membership of Astronomical Society of India.**

**2.** Member of International Science Development Team (ISDT) of Thirty Meter telescope.

**1. Young Associate of the Indian Academy of Sciences**  
Bangalore

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## Awards and Honors Received

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**7.** Awarded "**Certificate of Reviewer Excellence 2017**" by **Indian Academy of Science**, in recognition of **outstanding contribution for the Journal of astrophysics and astronomy.**

**6.** 2009: Selected as an **Young Associate of the Indian Academy of Sciences**  
Bangalore, 2009-2012

**5.** 2006: **Awarded Peter Gruber Foundation fellowship 2006 by International**

## **Astronomical Union.**

4. 2006: **Awarded R K Bhalla award 2006 by Indian Physics Association (Pune Chapter).**

3. 2001: 2 year Junior Research Fellowship and 3 year Senior Research Fellowship awarded by **Council of Scientific and Industrial Research (CSIR)** Govt. of India.

2. 2001: Qualify the all-India **Joint Entrance Screening Test (JEST) with a percentile of 98.6**, for admission to premier research institutes in India.

1. 2000: Qualify the **all-India UGC-NET/CSIR Test** and awarded CSIR JRF  
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## **Position held**

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### **Academic:**

**8. 21<sup>st</sup> November 2019-till present, Professor** of Physics and astronomical science at Central University Himachal Pradesh Dharamshala.

**7. 1st July 2017-18 November 2019, Scientist-E** ARIES, Nainital, India;

**6. 1st Jan 2013-30 June 2017 Scientist-D**, ARIES, Nainital, India;

**5. 1st Jan 2009- Dec 31 2012: Scientist-C**, ARIES, Nainital, India;

**4. 8th May 2008- Dec 31 2008: Scientist-B** ARIES, Nainital, India;

**3. May 2007-May 2008: Post-doc: PGF/IAU fellow**, at Institut d'Astrophysique de Paris

**2. Aug. 2006- May 2007: Post-doc:** Institut d'Astrophysique de Paris, Laboratoire de CNRS

**1. JRF/SRF of Ph. D[2001-06] : IUCAA**, University of Pune, Pune;  
Title: Probing the Universe Using Absorption Lines Seen in the Spectra of Quasars.  
Supervisor: Prof. R. Srianand

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### **Managements/facilities:**

**7. Managing extra-galactic section as editorial member of JOAA 2018-till now**

## **6. 4m International Liquid Mirror Telescope (ILMT)**

In charge and Indian-PI of the ILMT from March 2017-Nov 2019. As PI from the Indian side of ILMT, I have been involved in the installation and now commissioning phase of this telescope, along with all the administrative responsibility from the Indian side to set up this international facility.

## **5. 3.6m Devasthal Optical Telescope (DOT)**

Part of the assembly Integration and verification (AIV) team of 3.6m DOT during its installation 2015. Work as convener of DOT-3.6m Operation and Maintenance committee(DOMC) from March 2017 to Nov 2019.

## **4. E-administration portal Set up E-admin portal (23 portals, consisting of about**

**5-6 thousand php/html lines) for helping in efficient E-administration, and maintaining it (2012-2019)**

## **3. Coordinator of visiting student programme at ARIES 2012-2016**

**2. 2012- 2016: HOSTEL warden**, hostel maintenance and related students of ARIES.

## **1. In-charge of ARIES Science Popularization (ASPOP): Since 2012 - March 2017, with main activities as:**

Setting up Science Center at ARIES.

Lectures in school/college and organize workshop.

Model-Cum-Book Exhibition center at ARIES.

14 Inch Telescope for Live Telecast and Night Sky Watching Program.

5m Fixed Dome digital Planetarium.

Mobile observatory (3-inch optical and solar telescope).

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## **PUBLICATIONS [Refereed Paper Publications and Conference Proceedings]**

### **Refereed Paper Publications:**

For updated list of publication from NASA-ADS please click [HERE](#)

Citation: Total *number of citations* of below publications are **~1255 and H-Index** for results: **15**( as of January 2020 based on ADS).

### **Cumulative list as follow:**

**41. Comparative intra-night optical variability of X-ray and  $\gamma$ -ray detected narrow-line Seyfert 1 galaxies** Vineet Ojha, Hum Chand, Gopal-Krishna, Sapna Mishra, Krishan Chand, MNRAS 2020 in press

**40. Role of intervening Mg II absorbers on the rotation measure and fractional polarisation of the background quasars** Malik, Sunil; Chand, Hum; Seshadri, T. R., ApJ, 2020 in press

**39. Probing the Environment of High-z Quasars Using the Proximity Effect in Projected Quasar Pairs,** Jalan, Priyanka; Chand, Hum; Srianand, Raghunathan, ApJ 2019, 884,151J

**38. Are there broad absorption-line blazars?**

Mishra, Sapna; Krishna, Gopal; Chand, Hum; Chand, Krishan; Ojha, Vineet, 2019 MNRAS, Letter 489L, 42M

**37. C IV absorbers tracing cool gas in dense galaxy group/cluster environments**

Aditya Manuwal, Anand Narayanan, Sowgat Muzahid, Jane C. Charlton, Vikram Khaire, Hum Chand, 2019 MNRAS, 485, 30M

**36. Deceleration of CIV and SiIV broad absorption lines in X-ray bright quasar SDSS-J092345+512710**

Joshi, Ravi; Srianand, Raghunathan; Chand, Hum; Wu, Xue-Bing; Noterdaeme, Pasquier; Petitjean, Patrick; Ho, Luis C 2019ApJ, 871, 43J

**35. Intra-Night Optical monitoring of three -ray detected Narrow-line Seyfert 1 galaxies**

Vineet Ojha , Gopal-Krishna , Hum Chand; MNRAS 2019, MNRAS, 483, 30360

**34. X-ray/UV/optical variability of NGC 4593 with Swift: reprocessing of X-rays by an extended reprocessor;**

McHardy, I. M. et al (including Chand H) 2018 MNRAS, 480, 2881M

**33. Investigating kpc-scale radio emission properties of narrow-line Seyfert 1 galaxies**

Singh, Veeresh; Chand, Hum 2018 MNRAS 480 1796S

**32. Polarimetric and spectroscopic study of radio-quiet weak emission line quasars**

Kumar, P.; Chand, H.; Srianand, R.; Stalin, C. S.; Petitjean, P.; Gopal-Krishna 2018 MNRAS, 479, 5075K

**31. TIFR Near Infrared Imaging Camera-II on the 3.6 m Devasthal Optical Telescope**

Baug, T. et al (including Chand H) 2018, JAI, 750003B

**30. On the incidence of Mg II absorbers along the blazar sightlines**

Mishra, S.; Chand, H.; Krishna, Gopal-; Joshi, R.; Shchekinov, Y. A.; Fatkhullin, T. A. 2018, MNRAS, 473, 5154M

**29. A catalog of Narrow line Seyfert 1 galaxy from the Sloan Digital Sky Survey 12 data release**

Suvendu Rakshit, C.S. Stalin, Hum Chand and Xue-Guang Zhang, ApJS, 2017,229,39

**28. Multi-epoch intra-night optical monitoring of 8 radio-quiet BL Lac candidates**

P. Kumar; Gopal-Krishna, C. S. Stalin, H. Chand, R. Srianand, P. Petitjean, MNRAS 2017MNRAS.471..606K [IF: 4.9]

**27. Probing magnetic fields with Square Kilometre array and its precursors**

Roy, Subhashis; Sur, Sharanya; Subramanian, Kandaswamy; Mangalam, Arun; Seshadri, TR; Chand, Hum 2016, 37,42

**26. Intranight optical variability of radio-quiet weak emission line quasars-IV**

Kumar, P; Chand, H.; Gopal-Krishna; 2016, MNRAS, 461, 666K

**25. The origin of UV-optical variability in AGN and test of disc models: XMM-Newton and ground-based observations of NGC 4395**

McHardy, I. M . et al (including Chand H. 2016, AN, 337, 500M

**24. Intranight optical variability of radio-quiet weak emission line quasars-III**

Kumar, P; Gopal-Krishna;Chand, H.; 2015, MNRAS, 448, 1463

**23. Intranight optical variability of radio-quiet weak emission line quasars-II**

Chand, H.; Kumar, P; Gopal-Krishna; 2014, MNRAS, 441, 726

**22. C IV absorption line variability in X-ray bright BALQSOs**

Joshi, Ravi; Chand, H.; R. Srianand; Jhilik M. 2014, MNRAS, 442, 862]

**21. Incidence of strong Mg II absorbers towards different types of quasars**

Joshi, Ravi; Chand, H.; Gopal-Krishna; 2013, MNRAS, 435, 346  
x20. Dependence of residual rotation measure on intervening Mg II absorbers at cosmic distances  
Joshi, Ravi; Chand, H.; 2013, MNRAS, 434, 3566

**19. Signature of outflows in strong Mg II absorbers in quasar sightlines**

Sharma, Mahavir; Nath, Biman B.; Chand, H.; 2013, MNRAS, 431L, 93

**18. Intranight optical variability of radio-quiet weak emission line quasars**

Gopal-Krishna; Joshi, Ravi; Chand, H.; 2013, MNRAS, 430, 1302

**17. Intranight optical variability of radio-loud broad absorption line quasars**

Joshi, Ravi; Chand, H.; 2013, MNRAS, 429, 1717

**16. Incidence of Mg II absorption systems towards at-spectrum radio quasars**

Chand, H. ; Gopal-Krishna, 2012, ApJ, 754, 38 : astro-ph/1205.3273

**15. Probing spectral properties of radio-quiet quasars searched for optical microvariability-II**

Joshi, R; Chand, H. ; Wiita, Paul J.; Gupta, Alok C., Srianand R., 2012, MNRAS, 419, 3433 : astro-ph/1110.2334

**14. Optical microvariability properties of BALQSOs**

Joshi, Ravi; Chand, Hum; Gupta, Alok C.; Wiita, Paul J., 2011, MNRAS, 412, 2717 : astro-ph/1011.5611

**13. Probing spectral properties of radio-quiet quasars searched for optical microvariability**

Chand, H. ; Wiita, Paul J.; Gupta, Alok C., 2010, MNRAS, 402, 1059, astro-ph/0910.5292

**12. Constraining Fundamental Constants of Physics with Quasar Absorption Line Systems;**

Petitjean, Patrick; Srianand, Raghunathan; Chand, H.; Ivanchik, Alexander; Noter-daeme, Pasquier; Gupta, Neeraj, 2009, Space Science Review, 148, 289 astro-ph/0905.1516

**11. Line shift, line asymmetry, and the  ${}^6\text{Li}/{}^7\text{Li}$  isotopic ratio determination.**

Cayrel, R.; Ste\_en, M.; Chand, H.; Bonifacio, P.; Spite, M.; Spite, F.; Petitjean, P.; Ludwig, H.-G.; Ca\_au, E., 2007 A&A...473L..37C

**10. In response to the comments by Murphy et al. (PRL, 99, 239001, 2007).**

Srianand, R; Chand, H.; Petitjean, P; Aracil, B; PRL 99, 239002 (2007)

**9. On the variation of  $\alpha$ -ne-structure constant: Very high resolution HARPS spectrum of QSO HE 0515-4414**

Chand, H., Srianand, R., Petitjean, P. Aracil, B. Quast, R. Reimers, D. A&A 451,45-56 (2006) ; astro-ph/0601194 [IF: 5.2]

**8. Probing the time-variation of the  $\alpha$ -ne-structure constant: Results based on Si IV doublets from a UVES sample**

Chand, H.; Petitjean, P; Srianand, R.; Aracil, B. A&A 430,47-58 (2005); astro-ph/0408200[IF: 5.2]

**7. The density structure around quasars from optical depth statistics**

Rollinde,E.; Srianand, R.; T. Thenus, Petitjean, P.; Chand, H. MNRAS 361, 1015-1029 (2005).; astro-ph/0502284. [IF: 4.9]



**6. A new constraint on the time dependence of the proton-to-electron mass ratio. Analysis**

**of the Q 0347-383 and Q 0405-443 spectra**

Ivanchik, A.; Petitjean, P.; Varshalovich, D.; Aracil, B.; Srianand, R.; Chand, H.; Ledoux, C.; Boiss, P. A&A 440, 45-52 (2005)

**5. Probing the cosmological variation of the  $\alpha$ -structure constant: Results based on VLT-UVES sample**

Chand, H., Srianand, R., Petitjean, P., Aracil, B. A&A,417,853-871 (2004); astro-ph/0401094

**4. Limits on the Time Variation of the Electromagnetic Fine-Structure Constant in the Low**

**Energy Limit from Absorption Lines in the Spectra of Distant Quasars**

Srianand, R.; Chand, H.; Petitjean, P.; Aracil, B. PRL, 92, 121302 (2004); astro-ph/0402177

**3. Time dependence of the proton-to-electron mass ratio**

Patrick Petitjean, A. Ivanchik, Raghunathan Srianand , B. Aracil, D. Varshalovich ,H.

Chand, Esther Rodriguez, C. Ledoux, Patrick Boiss C. R. Physique 5, 411-415 (2004)

**2. Constraining the Time Variation of the Fine Structure Constant**

Raghunathan Srianand, Patrick Petitjean, Hum Chand, Bastien Aracil ESO Messenger N0-116 25-28 (2004)

**1. The Large Programme Cosmic Evolution of the IGM**

J. Bergeron, P. Petitjean, B. Aracil, C. Pichon, E. Scannapieco, R. Srianand, P. Boisse,

R. F. Carswell, H. Chand, S. Cristiani, A. Ferrara, M. Haehnelt, A. Hughes, T.-S Kim

C. Ledoux, P. Richter, M. Viel ESO Messenger N0-118, 40-44 (2004)

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**Conference Proceeding:**

For updated list of publication from NASA-ADS please click [HERE](#)

**18. Kpc-scale radio-jets in narrow-line Seyfert 1 galaxies;**

Singh, V.; Chand, H.; Ishwara-Chandra, C. H.; Kharb, P. Revisiting narrow-line Seyfert 1 galaxies and their place in the Universe. 9-13 April 2018. Padova Botanical Garden, Italy. Online at [https://pos.sissa.it/cgi-bin/reader/conf.cgi?con\\_d=328](https://pos.sissa.it/cgi-bin/reader/conf.cgi?con_d=328), id.29

**17. Probing the central engine and environment of AGN using ARIES 1.3-m and 3.6-m telescopes;**

Chand, H. et al. Bulletin of Liege Royal Society of Sciences, 2018, 87,291.

**16. Intra-night optical variability (INOV) properties of X-ray bright Narrow-line Seyfert 1 (NLSy 1) galaxies;**

Vineet Ojha, Hum Chand, Gopal-Krishna, Bulletin of Liege Royal Society of Sciences, 2018, 87,387.

**15. Spectroscopic and polarimetric study of radio-quiet weak emission line quasars.;**

Parveen Kumar, Hum Chand, Gopal-Krishna, R. Srianand, C. S Stalin, P. Petitjean, Bulletin of Liege Royal Society of Sciences, 2018,87,316

**14. Properties of Narrow line Seyfert 1 galaxies;**

Suwendu Rakshit, C. S. Stalin, and Hum Chand, Bulletin of Liege Royal Society of Sciences, 2018,87,379

**13. Transverse and Longitudinal proximity effect;**

Priyanka Jalan, Hum Chand, R. Srianand, Bulletin of Liege Royal Society of Sciences, 2018,87,330

**12. Incidence of Mg II absorbers towards Blazars;**

Sapna Mishra, Hum Chand, Gopal Krishna, Ravi Joshi, Bulletin of Liege Royal Society of Sciences, 2018, 87,325

**11. The 4m International Liquid Mirror Telescope**

Jean Surdej et al (including Hum Chand); Bulletin of Liege Royal Society of Sciences, 2018, 87,68

**10. Probing AGN central engine and its environment based on their photometry and spectroscopy**

Chand, H., Joshi, R., ASI Conf. Series, 12, 79.

**9. A search for the elusive radio-quiet BL Lacs**

Kumar, P; Chand, H., Gopal-Krishna, ASI Conf. Series, 12, 133.

**8. X-ray - UV/optical lag measurement in the very low mass AGN NGC4395 using the OM**

**in sub-second readout mode: Implications for disc models**

McHardy, I. et al. (including Chand H.) The Extremes of Black Hole Accretion, Proceed-ings of the conference" 2015ebha.confE..49M

**7. Probing Spectral Properties of Radio-quiet Quasars Searched for Optical Microvariability**

Wiita, Paul J.; Joshi, R; Chand, H. ; Gupta, Alok C., Srianand R., 2012, AAS, 21915415W

x6. Re-Analysis of QPO in 3C273 Light Curve

P. Mohan, A. Mangalam, Hum Chand and Alok C. Gupta 2011,JApA., 32, 117M

## **5. Probing the variation of fundamental constants using Quasar Absorption Line Systems**

Srianand R.; Petitjean P.; Chand H.; Noterdaeme P.; Gupta N.; Mem. S. A.Lt, 2009, 80, 842

## **4. On the variation of the $\alpha$ -ne-structure constant, and precision spectroscopy**

Chand, H., Srianand, R., Petitjean, P., Aracil, B. to appear in L. Pasquini, M. Romaniello, N.C. Santos, A. Correia, eds., ESO Astrophysics Symposia, Precision Spectroscopy in Astrophysics, 2007 (Springer-Verlag)

## **3. On the variation of the $\alpha$ -ne-structure constant, and precision spectroscopy**

Chand, H., Srianand, R., Petitjean, P., Aracil, B. to appear in L. Pasquini, M. Romaniello, N.C. Santos, A. Correia, eds., ESO Astrophysics Symposia, Precision Spectroscopy in Astrophysics, 2007 (Springer-Verlag)

## **2. Probing the variation of the $\alpha$ -ne-structure constant using QSO absorption lines**

Chand, H., Srianand, R., Petitjean, P., Aracil, B. in P. R. Williams, C. Shu, B. Menard, eds., Proc. IAU Colloquium 199, Probing Galaxies Through Quasar Absorption Lines, 2005 (Cambridge University Press, Cambridge, UK)

## **1. Does fine-structure constant vary ?**

Chand, H., Srianand, R., Petitjean, P., Aracil, B. BASI,...33..350C, 2005.

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## **Research Projects Completed/Ongoing**

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### **Ongoing:**

**2. "Devasthal optical telescope - AGN Reverberation Monitoring (DOT-ARM): Probing AGN black-hole mass and broad line regions"**, Total approved SERB grant: ₹40 lacs  
PI: H. Chand, Co-PI: A. Omar (ARIES)

**1. "Magnetic Fields as Probes of Astrophysical Phenomena"** Total approved SERB grant: ₹21 lacs  
PI: T. R. Seshadri (Delhi Univ.), Co-PI: H. Chand

### **Completed:**

**1. "Photometric monitoring of gravitationally lensed quasars and Photometric reverberation mapping of active galactic nuclei"** with Total approved SERB grant: ₹19 lacs

PI: S. Ratana Kumar as NPDF, H. Chand (mentor)

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## [Ph.D. Supervised](#)

3. **Thesis title: "Multi-wavelength study of Narrow-Line Seyfert Galaxies"**

Student: Mr Vineet Ojha

2. **Thesis title: On the nature of Weak Line QSOs**

Student: Mr. Parveen Kumar (Presently as PDF at PRL)

1. **Thesis title: Central Engine and Environments of Active Galactic Nuclei"**

Student: Mr. Ravi Joshi (now PDF as Bhole Fellow, Kavli Institute for Astronomy and Astrophysics, Peking University see <https://joshiravi.weebly.com/>).

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## [Ph.D. Supervising](#)

1. **Thesis title: "On the nature of AGN feedback --Ms Sapna Mishra**
2. **Thesis title: " Probing the physical state of the IGM: tool of cosmology"-- Ms Priyanka Jalan**
3. **Thesis title: "Extra-galactic astronomy based on International Liquid mirror 4m telescope" - Mr. Vbhore Negi ARIES students**
4. [As Co-guide] **Thesis title: "Astrophysical Magnetic Field". --Mr Sunil Malik**
5. **Thesis title: Probing the broad line region of AGN --Mr. Vivek Kumar Jha**

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## [Invited talks, Contributed talks and Seminar/Conferences](#)

### [Invited Talks](#)

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**14. High-z science requirement of the 30m class telescope; Thirty meter telescope(TMT)-Beyond First Light, Mysore, India, 2017-11-06 to 2017-11-09**

**13. On the high-resolution spectroscopic requirements for the studies of the cosmological variation of fundamental constants; Thirty meter telescope(TMT)-Beyond First Light, Mysore, India, 2017-11-06 to 2017-11-09**

**12. Probing the evolution of Universe and fundamental physics using Active Galactic Nuclei;**

Theoretical Physics Seminar Circuit (TPSC) at IIT Roorkee 28 Nov. 2017.

**11. IGM science with Thirty meter telescope (TMT)", TMT school at IUCAA, Pune from 16-27 January 2017.**

**10. Fundamental Physics with Thirty meter telescope (TMT)", TMT school at IUCAA, Pune from 16-27 January 2017.**

**9. On the Nature of Weak emission Line Radio-Quiet Quasars TIFR BALLOON FACILITY, HYDERABAD, INDIA, November 25 - 27, 2014**

**8. On the variation of Fundamental Constants over cosmic time Kangdi University Haridwar 12 March 2013**

**7. Cosmology-I &II, on behalf of Astronomical Society of India,\For Professional Enrichment Programme on Astronomy Awareness", NCSM, Kolkata, September 19-24, 2011.**

**6. Observational basics, Introductory Workshop on Optical and Infrared Astronomy, October 26-29, 2010.**

**5. Radiative process basics, Introductory Workshop on Optical and Infrared Astronomy, October 26-29, 2010.**

**4. Astronomical photometry basics, Introductory Workshop on Optical and Infrared Astronomy, October 26-29, 2010.**

**3. On the cosmic time variation of fundamental constant: PNC meeting, IAP, Paris- 31 May, 2007.**

**2. Constraints on the variation of  $n_e$ -structure constant, based on**

**HARPS and UVES/VLT data sample**, ESO conference "Precision Spectroscopy in Astrophysics, Aveiro Portugal, September, 2006

**1. Does fine-structure constant vary ?**, at 23<sup>rd</sup> ASI meeting, Nainital, India, February 2005

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## **Contributed Talks**

46. **Probing the environment of high-z quasars using the proximity effect in projected quasar pairs**, Cosmic Evolution of Quasars: from the First Light to Local Relics October 21-25, 2019, KIAA, Peking University Beijing China

45. **High resolution spectroscopy using upcoming TMT: Few science cases based on AGN spectroscopy**, TMT Science and Instruments Workshop 17-19 October 2019, ARIES Nainital

44 **Astronomy research opportunities using archival data: few key science cases**, 31 August 2019 IIT-Mandi, H.P, India

43 **Active Galactic Nuclei: a tool to probing the evolution of Universe and fundamental physics**, 29 August 2019, CUHP Physics and astronomical sciences.

42. **Astronomy research opportunity based on 1-4m class telescopes: synergy with archival astronomical data**, 29 August 2019, CUHP Physics and astronomical sciences

41. Seven talks in ATSOA-2018 during 19-28th March 2018 **(i )Excitement of Astronomy: few high-lights and historical development. (ii )Universe beyond milky way-I (iii )Galaxy and AGN : overview**

40. **On the incidence of MgII absorbers along the blazar sightlines**, in Galaxies in Absorption 2017, Dec 12 -14, IUCAA Pune

39. **A new Catalog of Narrow Line Seyfert 1 Galaxies from the Sloan Digital Sky Survey Data Release 12**, ARIES Nainital, 3 April 2017

**38. Probing the central engine and environment of AGN using ARIES 1.3 and 3.6m telescopes**, in \_First Belgo-Indian Network for Astronomy and Astrophysics, Nainital, India, during 15-18 November 2016.

**37. Spectral and polarimetric properties of Weak emission line radio-quiete QSOs**, ASI meeting, 10-13 May 2016 Srinagar, India.

**36. Probing AGN central engine and its environments based on its photometry and spectroscopy**, at RETCO-II, ARIES, May 7 2015

**35. Are weak emission line radio-quiete Quasars, radio-quiete counter part of BI-Lacs Objects;**  
Galaxy in absorption annual workshop at IUCAA, Pune; August 8, 2015

**34. On AGN outflows based on their associate absorber systems**,  
October 16 2015, International conference on "Jets: cause and effect" at ICTS Bangalore.

**33. Three talk on Motivational workshop on observational astronomy"**  
May 2015;(i) How well do we know our present universe (ii) Mile-stone in Astronomy .

**32. Seven talks in ATSOA-2016 during 29th Feb 2016- 11 March 2016**  
(i )Excitement of Astronomy: few high-lights and historical development.  
(ii )Optical Telescope- Where to point.  
(iii )Universe beyond milky way-I (iv )Universe beyond milky way-II (v )Galaxy and AGN  
I: overview (vi )Galaxy and AGN II: case studies (vii) Radiative process in astronomy

**31. Probing active galaxy central engine and its environments using gas dynamics.** ;Symposium: Structure and evolution of galaxies,IUCAA, Pune; Jan 22 - 23, 2015

**30. Active Galactic Nuclei: tool to probe the evolution of Universe;**  
Seminar at IISER-Mohali,  
August 20 2014

**29. Two talk on \Motivational workshop on observational astronomy"**  
May 2014;(i) Positional Astronomy (ii) Electromagnetic Radiation (iii) Extra Galactic Astronomy .

**28. Eight talks in ATSOA-2015 during 3-12 March 2015** (i )Excitement of Astronomy: few highlights and historical development. (ii )Optical Telescope-

Where to point. (iii) Magnitude systems: overview how to compute it (iv) Universe beyond milky way-I (v) Universe beyond milky way-II (vi) Galaxy and AGN I: overview (vii) Galaxy and AGN II: case studies (viii) Radiative process in astronomy

**27. Five talks on ATSOA-2014 during 3-12 March 2014:** (i) Coordinate and magnitude systems (ii) Universe beyond milky way-I (iii) Universe beyond milky way-II (iv) Galaxy and AGN: overview (v) Radiative process in astronomy

**26. AGN properties using their photometric and spectroscopic analysis** In house meeting ARIES 20 March 2013

**25. Five talks on ATSOA-2013 during 3-14 March 2013:** (i) Coordinate and magnitude systems (ii) Universe beyond milky way-I (iii) Universe beyond milky way-II (iv) Galaxy and AGN: overview (v) Radiative process in astronomy

**24. On the incident rate of Strong MgII absorbers Towards Different Types of Quasars;** International conference on "Galaxy in absorption" IUCAA, Pune, Dec. 17-20, 2012

**23. Background cosmology** Kumaun University, Nainital 26 Dec 2012

**22. Quasars tool to probe the extra-galactic universe** Kumaun University, Nainital 26 Dec 2012

**21. Does the number density of intervening MgII absorber depend on background sources?** Inter-disciplinary national science symposium, M. B college Haldwani, 4 Nov 2012

**20. AGN properties using their photometric and spectroscopic analysis** In house meeting ARIES 20 March 2013

**19. Three talk on Workshop of "Hand on experience on observational astronomy"** 1-5 December 2012: (i) Positional Astronomy (ii) Electromagnetic Radiation (iii) Extra Galactic Astronomy .

**18. Probing the Evolution of our Universe using Quasar spectroscopy,** at I.I.T Mandi, 11 June 2012.



17. **Does incidence of MgII absorption systems depend on the background sources?**, ARIES in-house meeting, April-19, 2012.
16. **Radiation: the finger prints for astronomer**, ARIES, ATSOA-2012, March 2 2012.
15. **Background cosmology: common misconceptions.**, ARIES, ATSOA-2012, March 5 2012.
14. **Kinematics & dynamics of the Universe**, COSMO-2011 Astronomy and Planetary Science, 13-14 Dec. 2011, ARIES, Nainital.
13. **On the origin of AGN microvariability: Clues based on their spectroscopic properties**; ASI Symposium-I "Cosmology and Galaxy Formation", IISER-Mohali, Nov. 5-7, 2011.
12. **Life Cycle of Star, Technology Day workshop** by UCOST at ARIES 11-12 May 2011.
11. **Quasar spectroscopy: a tool to probe the evolution of Universe** IISER Mohali- 28 March 2011.
10. **Observational Basics: Co-ordinate systems and various observatory**, ARIES, ATSOA-2011, March 7 2011.
9. **Radiative Processes basics**, ARIES, ATSOA-2011, March 10 2011.
8. **Quasar Spectroscopy: tool to probe the evolution of Universe**, ARIES, ATSOA-2011, March 11 2012.
7. **Observatory window to probe the Universe** GDC Karsog Mandi, HP- 02 Jan 2011.
6. **Quasar Absorption line: tool of cosmology**, ARIES in-house meeting, April-2, 2009.
5. **On the variation of fundamental constant and precision spectroscopy**, Indo-Africa workshop- 31 Oct. 2008.
4. **On the variation of  $H_0$ -structure constant and precision spectroscopy** , ARIES, Nainital, INDIA, 20 June, 2007.
3. **Probing the Universe Using Absorption Lines Seen in the Spectra of**

## **Quasars,**

Physics Department, Pune University, INDIA, 26 July, 2007

**2. Results on the variation of fine-structure constant,,** based on UVES/VLT data sample, IUCAA SAC meeting, Pune, January, 2006

**1. The Transverse Proximity effect: A Probe to the Environment, Anisotropy, and Megayear Variability of QSOs,** IUCAA,Pune, November, 2004

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## **School Workshop and Conferences:**

**29. International Workshop on QSO Absorption Lines IUCAA,** Pune, India 2017-12-11 to 2017-12-15

**28. Astro-Sat View of AGN Central Engines IUCAA,** Pune 2017-12-18 to 2017-12-21

**27. Thirty meter telescope(TMT)-Beyond First Light Mysore, India** 2017-11-06 to 2017-11-09

**26. First Belgo-Indian Network for Astronomy and Astrophysics,** Nainital, India, during 15-18 November 2016

**25. Extragalactic Relativistic Jets: Cause and Effect** 12-20 October 2015, ICTS Bangalor, India

**24. ASI meeting,** 10-13 May 2016 Srinagar, India.

**23. Recent Trends in the study of Compact Objects Theory and Observation-II** ARIES, Nainital; May 6-8, 2015

**22. Central Region of spiral galaxy, IUCAA,** Pune; Jan 22 - 23, 2015

**21. Infrared astronomy in India** TIFR BALLOON FACILITY, HYDERABAD, INDIA, November 25 - 27, 2014

**20. The Physics and Mathematics of Universe** March 11-12, 2013 , Gurukula Kangri Vishwavidyalaya, Haridwar

**19. International conference on "Galaxy in absorption"** Dec. 17-20, 2012, IUCAA, Pune

**18. Inter-disciplinary national science symposium** Nov 3-4, 2012, M. B college Haldwani

17. **ASI Symposium I Cosmology and Galaxy Formation** Nov. 5-7, 2011, IISER-Mohali
16. **Professional Enrichment Programme on Astronomy Awareness**, NCSM, Kolkata, India, September 19-24, 2011.
15. **Wideband X-ray Astronomy: Frontiers in Timing and Spectroscopy** January 13 - 16, 2011, IUCAA, Pune
14. **Workshop : Optical and Infrared Astronomy** October 26 - 29, 2010, Gorakhpur University
13. **Bhabha Centenary Symposium held at TIFR** December 3-5, 2009, TIFR, India.
12. **IUCAA training school on X-ray astronomy** February 1-28, 2009, Pune India.
11. **PNC meeting at IAP Paris** May 31, 2007, Paris, France.
10. **Precision Spectroscopy in Astrophysics** September 11-15 , 2006 Aveiro, Portugal
9. **IAU General assembly XXVI: Participant of Young Astronomers Events.** August, 14th to 18th, 2006, Prague Czech Republic
8. **IAU Colloquium 199 : Probing Galaxies Through QSO Absorption Line** March, 14th to 18th, 2005 Shanghai Astronomical Observatory, Shanghai, China
7. **23rd Astronomical Society of India (ASI) Meeting:** 21 - 24 Feb, 2005, ARIES, Nainital, India.
6. **Workshop on Supernovae and their connection to GRBs and pulsars:** January, 20th to 23th, 2004, Tata Institute of Fundamental Research, Mumbai 400 005, India.
5. **School on Radio Interferometry and Aperture Synthesis** June, 2-22, 2003 National Center for Radio Astronomy, Pune 411 007, India
4. **Symposium on Provocative Universe:** July 2003, IUCAA, Pune
3. **IUCAA-IfA (Hawaii) Workshop on Cosmology and High Redshift Universe** February, 2003, IUCAA, Pune
2. **The 22nd Meeting of the Indian Association for General Relativity and Gravitation** December, 2002, IUCAA, Pune

1. **Annual Meet of the Astronomical Society of India** February 2002,  
Pune-411007, India

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## Course taught

### **Master course:**

<b>Course name/type</b>	<b>Class/place</b>	<b>Year (contact hr)</b>
Cosmology (open elective)	MSc IV semester Physics & astronomical science CUHP	2020-2021 (ongoing)
Essence of scientific programming (Skill development)	MSc II semester (open course Master level CUHP)	2020-2021 (ongoing)

### **Pre-Phd course**

<b>Position</b>	<b>Course</b>	<b>Place</b>	<b>Year (contact hr)</b>
Scientist -E	Cosmological Physics	ARIES Pre- Ph.D	2019-2020 (18)
Scientist -E	Cosmological Physics	ARIES Pre- Ph.D	2018-2019 (18)
Scientist -E	Cosmological Physics	ARIES Pre- Ph.D	2017-2018 (18)
Scientist -D	Cosmological Physics	ARIES Pre- Ph.D	2016-2017 (18)
Scientist -D	Mathematical and Statistical Methods	ARIES Pre- Ph.D	2015-2016 (18)
Scientist -D	Extra-Galactic Astronomy	ARIES Pre- Ph.D	2015-2016 (14)
Scientist -D	Cosmological Physics	ARIES Pre- Ph.D	2014-2015 (18)
Scientist -D	Diffuse Matter in Universe:ISM & IGM	ARIES Pre- Ph.D	2014-2015 (20)
Scientist -D	Electrodynamics and radiation	ARIES Pre- Ph.D	2014-2015 (14)
Scientist -D	Extra-galactic astronomy	ARIES Pre- Ph.D	2013-2014 (14)
Scientist -D	Stellar structure and	ARIES Pre- Ph.D	2013-2014

	evolution		(18)
Scientist -D	Fluid mechanics:Hydro-dynamics	ARIES Pre- Ph.D	2013-2014 (8)
Scientist -D	Extra-galactic astronomy	ARIES Pre- Ph.D	2012-2013 (8)
Scientist -D	Radio astronomy	ARIES Pre- Ph.D	2012-2013 (6)
Scientist -C	Electrodynamics and radiation	ARIES Pre- Ph.D	2012-2013 (10)
Scientist -C	Stellar atmosphere	ARIES Pre- Ph.D	2012-2013 (15)
Scientist -C	Cosmological Physics	ARIES Pre- Ph.D	2011-2012 (14)
Scientist -C	Electrodynamics and radiative	ARIES Pre- Ph.D	2011-2012 (20)
	process in Astrophysics	course work	
Scientist -C	Electrodynamics and radiative	ARIES Pre- Ph.D	2010-2011 (20)
	process in Astrophysics		
Scientist -C	Course on X-ray Astronomy	ARIES Pre- Ph.D	2010-11 (10)
Scientist -C	Extragalactic astronomy II: cosmology	ARIES Pre- Ph.D	2010-11 (10)
Scientist -C	Radiative process in Astrophysics	ARIES Pre- Ph.D	2009-10 (17)
Scientist -C	Gravitation and Cosmology	ARIES Pre- Ph.D	2009-10 (10)
Scientist -B	Gravitation and Cosmology	ARIES Pre- Ph.D	2008-09 (14)
Student at IUCAA	Tutorial Assistant-ship:	IUCAA	2004-05 (14)
	Inter-stellar medium	Graduate school	

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## **Observational/telescope experiences**

[About 50-60 nights total, with 1m, 2m and 10m class telescopes]

**9. 3.6m DOT observation experience during its commission phase**

**8. 30hr nights** of observation using **ASTROSAT Telescope**: December 2016.

**7. 60 nights** of observation using **DFOT Telescope**: 2011-2016.

6. 6 nights of observation using **IGO Telescope**: 2009-2011.
5. **6 nights** of observation using **HCT Telescope**: 2009-2010.
4. **12 nights** of observation using **ARIES Telescope**: 2008-2010.
3. **Three** night of observation using **UVES/VLT** at European Southern Observatory (ESO)  
- Paranal, October 2004.
2. **Four night** of observation using **HARPS at 3.6m** telescope of European Southern Observatory (ESO) - La Silla, December 2003.
1. **Two days** of radio observation using GMRT at Narayangoan, Pune June, 2003.

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## [Project Students supervised](#)

### **Summer projects students (M.Sc/B.Sc level): 2-3 month projects (Total 29)**

— 2018-19: (total 2)

Spectral Energy Distributions of Quasars with Weak Emission Lines ; Mr. Ayush Sahu, Centre for Basic Science, Raipur University (IAS summer fellow), July-August 2019.

Devesthal Optical Telescope: AGN reverbration maping project, strategy and calibration; Mr Vivek Kumar Jha, ARIES Grad school

April-July 2019

— 2017-18: (total 2)

Multi-object variability experiments; Ms Pranita, IIT-Kharagpur 2018 June-July

4m Liquid miror telescope; Mr Vibhore Nagi, ARIES 2018 MAY-July

2016-17: (total 3)

INOV properties of blazar like BALQSOs; Ms Sridevi, IISER-Bhopal 2017

INOV properties of X-ray detected and gamma-ray undetected NLSY-1 galaxies ; Mr. Parth Sunil, IISER-Bhopal 2017.

Photometric Reverberation mapping of low-luminosity AGN ; Mr. Krishan Kumar, ARIES, ARIES-gradual school project 2017.

— 2015-16: (total 3)

Measuring the time delay in multiple lens QSOs, ; Ms. Kanchan Soni, IISER TVM, INSPIRE fellow, June-July 2016.

Constraining mean UV-radiation field (J21) using transverse proximity effects in QSO pairs ; Ms. Priyanka Jalan, ARIES Graduate school project, May-July 2016  
Modeling the occurrence rate of MgII absorber using halo mass function ; Mr. Anurag Mishra, IIST-TVM, June-July 2016.

— 2014-15: (total 3)

Probing the physical state of 21cm absorber in the line of sight to background radio quasar; Ms. Avani Parmar, Pune University, Academy summer fellow, June-July 2015 (see AIPS GMRT step by step manual [HERE](#) and download its pdf version [HERE](#) ).

Probing cool gas outflow base on number density of MgII absorbers; ARIES Graduate school project, Ms. Sapna Mishra, May-July 2015  
Faraday rotation of intervening galaxy, a probe of high-z magnetic field; Ms. Vidushi Sharma, ARIES Graduate school project, May-July 2015.

— 2013-14: (total 3)

Probing the associated environment of the quasar q0059-2735; Pritam Jayoti, Tejpur central University, Assam, Academy summer fellow, June-July 2014.

Blazar absorber spectroscopy from UVES/VLT and HCT data; Sruthil, Paundichery central University, Paundichery, Academy summer fellow, May-June 2014.

Astrophysical Line Driven Winds; Reetika Joshi, Kumaun University Nainital, INSPIRE fellow, April-June 2014.

— 2012-13: (total 3+2=5)

Incidence of Mg II absorption systems towards Steep-spectrum radio quasars and blazars; Anikhet Gaur, IISER Mohali, INSPIRE fellow Dec. 2013 (coming for project extension)

Incidence of CIV absorption systems towards flat-spectrum radio quasars and blazars, Mayank Singh, CBS Mumbai, Academy summer fellow, Dec 2013 (coming for project extension)

The Broad absorption line (BAL) QSOs: constraint outflow using BAL line, Pritam Jayoti, Tejpur central University, Assam, Academy summer fellow, May-June 2013.

The X-ray loud BAL QSOs: spectral variability modeling, , Jhilik Majumdar, Jadhapur University, West Bengal, Academy summer fellow, June-July 2013.

Optical micro-variability study of Quasars, Hemant Kumar Verma, PRS University Raipur, March-April 2013.

— 2011-12: (total 4)

Spectral properties of flat-spectrum radio quasars, Sukruti Bansal, IISER Pune, Academy summer fellow, June-July 2012 (project report prepared and talk given)

Incidence of CIV absorption systems towards flat-spectrum radio quasars and blazars, Mayank Singh, CBS Mumbai, Academy summer fellow, May-June 2012 (project report prepared and talk given)  
On the Incidence Rate of Intervening CIV Absorption Systems Towards SSRQs and RQQSO ; Deepak Kumar Deo, IISER Bhopal, INSPIRE fellow, May-June 2012 (project report prepared and talk given)  
Incidence of Mg II absorption systems towards Steep-spectrum radio quasars and blazars; Anikhet Gaur, IISER Mohali, INSPIRE fellow June-July 2012 (project report prepared and talk given)

— 2010-2011: (total 1)

Does number statistics of MgII absorption line systems depend on polarisation of background sources?; Parashakti, Bharathidasan Uni., Tiruchirapalli, Academy summer fellow, May-June 2011 (project report prepared and talk given)

— 2009-2010: (total 2)

Probing the cosmological variation of the fine-structure constant; Ramabhadran Sundaram, NITK Surathkal, Academy summer fellow, June-July 2010 (project report prepared and talk given)  
Photo- ionization modeling of QSO absorber:  $z_{abs} = 1.149$  seen toward QSO HE0515-4414; NIT Roukela, Academy summer fellow, June-July 2010 (project report prepared and talk given)

— 2008-09: (total 1)

Wavelet analysis of AGN light curve; Tushar Aggrawal, NIT Jamshedpur, June-July 2010

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