

Ankur Sharma

Date of Birth	2 nd August 1991	Gender	Male
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Research Interests

Phenomenological studies of VHE emission from jets of AGNs; multi-messenger and multi-wavelength connection in blazars with neutrino, gamma-ray and X-ray data; gamma-ray astronomy; observability of point sources with Cherenkov neutrino telescopes; detection strategies for ultra-high energy neutrinos

Education

Jan 2017 - PhD in Physics - University of Pisa (Italy)

Present **Area of study** - Astroparticle Physics, Neutrino Astrophysics
- *Astroparticles, Experimental Astrophysics & Astroparticle Physics*
- *High Energy Experimental Physics*
Thesis Title - Analyzing the high energy activity of candidate blazars to constrain their observability by neutrino telescopes
Supervisor - Dr. Antonio Marinelli (antonio.marinelli@pi.infn.it)

Aug 2009 - Integrated M.Sc. (M.Sc. + B.Sc.) in Applied Physics - Indian Institute of Technology (ISM), Dhanbad

Feb 2015 **Area of study** - Applied Physics
- *Nuclear & Particle Physics, Classical Mechanics, Quantum Mechanics, Electrodynamics*
- *Computer Networks, Microprocessors, C++, ForTran*

Sept 2013 - Erasmus Mundus India4EU II Exchange Mobility - University of Porto (Portugal)

July 2014 **Area of study** - Master Thesis, Astronomy
- *Stellar Structure & Evolution, Cosmology*
- *Optical Communication, Measurement Techniques & Instrumentation*
Thesis Title - Constraining the Parameter Space of Dynamical Dark Energy Models: CPL & BSBM
Supervisor - Prof. Carlos J. A. P. Martins (carlos.martins@astro.up.pt)

July 2009 A level - Vidya Mandir Sr. Sec. School, Kota (India)
Board - Central Board of Secondary Education (CBSE)
Grade 8.02/10

Employment History

Dec 2015 - SPACE India, New Delhi

Dec 2016 **Designation** - *Astronomy Educator*

Responsibilities - Amateur astronomy, astronomy communication and popularization among school children and communities; Content development and testing; Organizing and conducting events like Sally Ride EarthKAM, All India Asteroid Search Campaign, Project Paridhi (Earth's Circumference), Mercury Transit Observation

June 2020 - Department of Physics & Astronomy, Uppsala University

Present **Designation** - *Post-doctoral Fellow*

Responsibilities - Understanding the discrepancy between angular uncertainties in offline and online reconstruction of IceCube public alerts; Search for neutrinos from X-ray selected blazars using IceCube data, Service tasks for IceCube Upgrade

Research Experience

May 2013 - Laboratori Nazionali del Gran Sasso (LNGS), Italy

July 2013 **Project Title** - Tagging of Radioactive Surface Background with AbSuRD

Experiment - CUORE

Supervisor - Prof. Carlo Bucci (carlo.bucci@lngs.infn.it)

May 2012 - National Institute for Subatomic Physics (NIKHEF), Amsterdam (Netherlands)

July 2012 **Project Title** - Performance study of a new Track Reconstruction mechanism for analysis of GRB alerts

Experiment - ANTARES

Supervisor - Prof. Dorothea Samtleben (dosamt@nikhef.nl)

Dec 2011 - Tata Institute for Fundamental Research (TIFR), Mumbai (India)

Jan 2012 **Project Title** - Feasibility study of Cosmic Muon Tomography using the prototype RPC stack at TIFR

Experiment - INO

Supervisor - Prof. Naba K. Mondal (nkm@tifr.res.in)

May 2011 - University of Wisconsin-Madison, USA

July 2011 **Project Title** - Extensive Air Shower veto with IceTop surface array

Experiment - IceCube

Supervisor - Prof. Francis Halzen (halzen@icecube.wisc.edu)

Experiments

Jan 2017 - KM3NeT (km^3 Neutrino Telescope)

Present **Institute** - *INFN Pisa*

Working Groups:

- **Data Analysis Group (2017):** Analysis of ToT signals and PMT rates with KM3NeT/ARCA data
- **Calibration Group (2018):** Inter-DOM time calibration with atm. muons for ARCA and ORCA
- **Multi-messenger Group (2019):** Time-Dependent & Differential Sensitivity of ARCA to TXS 0506+056

June 2020 - IceCube Observatory

Present **Institute** - *Uppsala University*

Working Groups:

- **Realtime Alerts group:** Angular uncertainties of offline and online reconstruction
- **Nu-sources Working Group:** Search for neutrinos from X-ray selected blazars

Conferences

- Dec 2019** Town Hall KM3NeT Multi-messenger Meeting
Marseille, France
Poster: Time-Dependent Sensitivity and Discovery Potential for the KM3NeT-ARCA detector
- July - Aug 2019** 36th International Cosmic Ray Conference (ICRC)
Madison, Wisconsin, USA
Talk: Characterizing the High-Energy Activity of Blazars Possibly Correlated with Observed Astrophysical Neutrinos
Poster: Time-Dependent Sensitivity and Discovery Potential for the KM3NeT-ARCA detector
Poster: KM3NeT/ARCA Expectations for the Low Latitude Bubbles
- Jan 2019** eXtreme19
Padova, Italy
Talk: Exploring the activity of extreme blazars and their observability through a neutrino telescope
- Aug 2018** TeV Particle Astrophysics (TeVPA) Conference
Berlin, Germany
Poster: From TXS 0506+056 to OP 313, Exploring Candidate Astrophysical Neutrino Emitters

Schools/Workshops

- June 2020** IceCube BootCamp: Summer 2020
Madison, WI, USA (virtual)
Essentials of Neutrino Astronomy and IceCube Software
- June 2019** OPTICON & Erasmus+ Summer School
Tatranska Lomnica, Slovakia
Observational Astrophysics: From Proposals to Publications
Project: Spectral analysis of near-Earth asteroids (381906) 2010 CL19 and (453778) 2011 JK using IRAF
- June 2018** Dublin Institute for Advanced Studies (DIAS) Summer School
Dublin, Ireland
Summer School in High Energy Astrophysics
- March 2018** Munich Institute for AstroParticle Physics (MIAPP) Topical Workshop
Munich, Germany
The High Energy Universe: Gamma Ray, Neutrino and Cosmic Ray Astronomy
- Nov 2017** KM3NeT First BootCamp
Valencia, Spain
Data Analysis and Simulation Tools in KM3NeT
- June 2017** International School on Astroparticle Physics (ISAPP)
Arenzano, Italy
Neutrinos in Physics, Astrophysics and Cosmology

Software Skills

■ Analysis Software

ROOT
Fermi Science Tools (Enrico, FermiPy)
HEASoft
IRAF
Astrometrica

■ Simulation Software

Geant4

■ Programming Languages

C, C++
Python
ForTran

Scholarships

2013 - 14 Erasmus Mundus INDIA 4EUII Masters Scholarship

2009 - 14 INSPIRE Scholarship for Higher Education (Govt. of India)

Leadership Experience

2009 - 14 Kartavya, Dhanbad Chapter (80G Certified NGO)

Position - Senior Volunteer & Co-Coordinator

Responsibilities -

Co-Coordinator - Led a team of 150 volunteers involved in managing the education and health of ~ 350 underprivileged children; increased attendance by ~ 30%

Project RTE - Collaborated with district administration for better targeting of RTE Act; ensured exclusion of malafide beneficiaries to secure admission of 150 underprivileged students in elite private schools

Social Upliftment - Dealt with sensitive cases of domestic violence, substance abuse, child marriage and other social maladies

Community Development - Instituted social welfare initiatives like substance abuse awareness programs, regular health camps, solar lamp distribution, regulation of water supply, cleanliness drives

Management - Worked in tandem with various stakeholders: schools, local administration, communities etc. to guarantee smooth and continuing education for the slum children

Teaching Experience

2018 University of Pisa, Italy

Position - Teaching Assistant

Responsibilities - Conducted Physics Lab I of 1st year undergraduate students as a substitute teacher

2015 - 16 SPACE India, New Delhi

Position - Astronomy Educator

Responsibilities -

- Taught regular astronomy-based topics in elite schools of Delhi for children upto grade 10

- Conducted workshops to train students in telescope data analysis using Astrometrica for All India Asteroid Search Campaign

- Conducted public outreach sessions for major astronomical events

Sept. 2015 Jodhpur National University, Jodhpur

Position - Guest Faculty

Responsibilities - Delivered two guest lectures on elementary Neutrino Physics to Nigerian exchange students of M.Sc. Physics, III semester

2012 - 14 Sarva Shiksha Abhiyan, Dhanbad

Position - Volunteer Teacher

Responsibilities -

- Provided teaching assistance in 2 govt. middle schools around the university campus with permission from district administration

- Job profile included taking note of and bringing forth the issues of the schools that lay in negligence and assisting the tenured teaching staff when necessary

Languages

- **Hindi** - Native
- **English** - C2
- **Italian** - A1

List of Publications

1. Characterisation of the Hamamatsu photomultipliers for the KM3NeT Neutrino Telescope, S. Aiello et al. (KM3NeT Collaboration), *JINST* 13 (2018) no.05, P05035
DOI: 10.1088/1748-0221/13/05/p05035
2. Sensitivity of the KM3NeT/ARCA neutrino telescope to point-like neutrino sources, S. Aiello et al. (KM3NeT Collaboration), *Astropart.Phys.* 111 (2019) 100-110
DOI: 10.1016/j.astropartphys.2019.04.002
3. KM3NeT front-end and readout electronics system: hardware, firmware and software, S. Aiello et al. (KM3NeT Collaboration), *JATIS*. 5 (2019) 4, 046001
DOI: 10.1117/1.JATIS.5.4.046001
4. The Control Unit of the KM3NeT Data Acquisition System, S. Aiello et al. (KM3NeT Collaboration), *Comput.Phys.Commun.* 256 (2020) 107433
DOI: 10.1016/j.cpc.2020.107433
5. gSeaGen: The KM3NeT GENIE-based code for neutrino telescopes, S. Aiello et al. (KM3NeT Collaboration), *Comput.Phys.Commun.* 256 (2020) 107477
DOI: 10.1016/j.cpc.2020.107477
6. Event reconstruction for KM3NeT/ORCA using convolutional neural networks, S. Aiello et al. (KM3NeT Collaboration), *JINST* 15 (2020) 10, P10005
DOI: 10.1088/1748-0221/15/10/P10005
7. Deep-sea deployment of the KM3NeT neutrino telescope detection units by self-unrolling, S. Aiello et al. (KM3NeT Collaboration), *31 Jul 2020 (submitted)*
e-Print: arXiv:2007.16090
8. Optical spectra of near-Earth asteroids (381906) 2010 CL19 and (453778) 2011 JK, Kučáková, H.; Mikhalechenko, O.; Popescu, M.; Ransome, C.; Sharma, A., *Contributions of the Astronomical Observatory Skalnaté Pleso, vol. 49, no. 3, p. 532-538*
DOI: astro.sk/caosp/Eedition/FullTexts/vol49no3/
9. Analyzing the activity of neutrino emitter candidates: comparing TXS 0506+056 with other blazars, A. Marinelli, M. Osorio, J. R. Sacahui Reyes, A. Sharma (**submitted**)
e-Print: arXiv:1909.13198
10. Study of Blazar activity in 10 year Fermi-LAT data and implications for TeV neutrino expectations, J. R. Sacahui, A. V. Penacchioni, A. Marinelli, A. Sharma, M. Castro, J. M. Osorio, M. A. Morales (**submitted**)
e-Print: arXiv:2011.13043

Proceedings:

11. Time-Dependent Sensitivity and Discovery Potential for the KM3NeT-ARCA detector, A. Sharma, A. Marinelli for the KM3NeT Collaboration, *Proceedings of ICRC 2019, PoS(ICRC2019)998*
12. Characterizing the High-Energy Activity of Blazars Possibly Correlated with Observed Astrophysical Neutrinos, A. Sharma, A. Marinelli, R. Sacahui, M. Osorio, *Proceedings of ICRC 2019, PoS(ICRC2019)1009*
13. KM3NeT/ARCA Expectations for the Low Latitude Bubbles, A. Marinelli, R. Coniglione, A. Sharma for the KM3NeT Collaboration, *Proceedings of ICRC 2019, PoS(ICRC2019)956*