

# Muzamil Ahmad Bhat

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Govt. Degree College (Boys) Baramulla  
Baramulla  
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## Education

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- **Ph.D.:** Experimental High Energy Physics
  - Institute: Aligarh Muslim University, Aligarh
  - Thesis title: **Search for first generation scalar leptoquarks with the CMS experiment**, Supervisor: Prof. Tariq Aziz and Prof Shafiq Ahmad.
- **M.Sc.:** (2011-13) Physics
  - Institute: University of Kashmir, Srinagar.
  - First class (74%)
- **B.Sc.:** (2008-10) English, Physics, Electronics and Mathematics
  - Institute: Govt. Degree College Bemina, Srinagar, India.
  - First class (70%)

## Research Highlights

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- **Search for the pair production of first generation scalar leptoquarks with 13 TeV CMS data :** My doctoral research focused on searches for pair-produced first generation scalar leptoquarks, resulting in a final state of two electrons and at least two jets, or one electron, missing transverse energy and at least two jets. In addition to contributing to the overall analysis design, I played a leading role in the estimation of QCD multijet background using a data-driven approach, the calculation of trigger efficiency, various systematic uncertainties and the final limit.
  - Taking my experience in this analysis forward, I have mentored a master student in developing a new analysis strategy to search for leptoquarks in the channel of two electrons and at least two b-tagged jets.
- **Calorimeter noise studies:** I have closely worked in the prompt feedback group of the CMS Hadron Calorimeter (HCAL). I was the in-charge of monitoring the performance of various HCAL filters and ensuring the noise robustness of the collision data.

## Key Publications

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- **Journal:**  
Co-Author of 114 papers

- **CMS Internal Notes:**

1. Search for Pair-production of First Generation Scalar Leptoquarks in pp Collisions at  $\sqrt{s} = 13$  TeV using 2015 data (CMS AN-15-294)
2. Search for Pair-production of First Generation Scalar Leptoquarks in pp Collisions at  $\sqrt{s} = 13$  TeV with 2016 data (CMS AN-16-426)

- **CMS Public Documents:**

1. Search for pair-production of first generation scalar leptoquarks in pp Collisions at  $\sqrt{s} = 13$  TeV with  $2.6 \text{ fb}^{-1}$  (CMS PAS EXO-16-043)
2. Search for pair production of first-generation scalar leptoquarks at  $\sqrt{s} = 13$  TeV (Phys. Rev. D99 (2019) 052002, CMS PAS EXO-17-009, arXiv:1811.01197)

- **Conference Proceedings:**

1. Search for the Pair-production of First Generation Leptoquarks in pp Collisions at  $\sqrt{s} = 13$  TeV [XXII DAE-BRNS High Energy Physics Symposium, Springer Proceedings in Physics 203, DOI: 10.1007/978-3-319-73171-1\_151]
2. Multiplicity Characteristics of Forward-Backward Emitted Particles in Heavy-Ion Interactions at SPS Energies [XXI DAE-BRNS High Energy Physics Symposium, Springer Proceedings in Physics 174, DOI: 10.1007/978-3-319-25619-1\_10]

## Mentoring Experience

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- Presently working as an Assistant Professor (Physics) at the Govt Degree College (Boys), Baramulla.
- Mentored a master student Mr. Jay Deshmukh in leptoquark search analysis.
- Six-month teaching experience of laboratory classes in B.Sc. level at the Department of Physics of Aligarh Muslim University.

## Academic Achievements

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- Got the Best Student Award in the High School.
- Qualified for All India Univeristy Grants Commision Junior Research Fellowship test, a nation-wide test held by University Grants Commission of the Govt. of India for selecting Ph.D. fellows.
- Awarded with the Students Merit Scholarship during M.Sc.

## Technical Skills

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- Proficient in C++, Python, Fortran and working knowledge of Shell scripting
- Extensive experience with HEP analysis software pakage ROOT.
- Expertise in analysis framework development based on CMS software package. [link1]
- Good knowledge of LaTeX, Microsoft Office (Word, Powerpoint and Excel).
- Working knowledge of Linux and Windows operating systems