

# Curriculum vitae — Dr. Inderpal Singh

**Current Address:**

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**CITIZENSHIP: INDIAN**

**Date of Birth: 06 February, 1982**

**Gender: Male**

**Employment:** Assistant Professor at Sri Guru Granth Sahib World University, Fatehgarh Sahib, Punjab, India.

**EDUCATION:****Ph.D.(Experimental High Energy Physics)**

Panjab University, Chandigarh, 2006-2012.

**Thesis Topic:**

MEASUREMENT OF THE NEUTRAL CURRENT ELECTRON-PROTON CROSS-SECTION AT HIGH BJORKEN- $x$  WITH ZEUS DETECTOR AT HERA.

**Supervisor:** Prof. Manjit Kaur

**Master of Science (2004-2006), 79% Marks**

Panjab University, Chandigarh, June, 2006.

Concentration : Physics.

**Bachelor of Education (2003-2004), 71% Marks**

Panjab University, Chandigarh, May, 2004.

Concentration: Teaching of Science.

**Bachelor of Science (2000-2003), 84% Marks**

Panjab University, Chandigarh, May, 2003.

Concentration: Physics, Chemistry, Mathematics.

**National Awards:**

- Qualified National Eligibility Test (NET-UGC), 2005.

**Positions Held:**

- Junior Research Fellow (JRF), University Grants Commission (UGC), India (2006 - 2008).
- Senior Research Fellow (SRF), University Grants Commission (UGC), India (2008 - August, 2011).
- Frequently visited Max Planck Institute for Physics, Munich and DESY, Hamburg (Germany) during Ph.D. (Jan, 2007 - May, 2011).
- Member of **ZEUS Collaboration** since 2007.
- Member of **Indian Physics Association**.

## Teaching Experience

- Post graduate government college for girls, sector 11, Chandigarh, Nov. 2011 - Feb. 2012.
- Sri Guru Granth Sahib World University, Fatehgarh Sahib, July 2012 - till date.

## Computer Skills

- **Programming Languages:** C++, FORTRAN, Shell script, HTML, Latex.
- **Analysis Tools:** ROOT, ORANGE (ZEUS analysis software), BAT (Bayesian Analysis Toolkit)

## Work done in ZEUS experiment of HERA Accelerator

- **Creation of data sets:** Making root files of data collected by ZEUS experiment and MC simulations.
- **Energy calibrations:** Carried out energy calibrations for the scattered electron and jets.
- **Interaction vertex re-weighting for MC:** The calculations of kinematic variables in ZEUS depend upon the position of the vertex because it is the reference point to measure polar angle of the electron and hadrons. The acceptance corrections will be compromised and the measurements made by the MC will not be accurate if the Zvtx in data is not well described by MC.
- **Track matching efficiency study:** Scattered electron should have a track in the tracking detector which should be matched to the energy cluster in the calorimeter. Both data and MC should follow this criteria, if not then proper weight is applied to MC so that the track matching efficiency of data and MC agree well within 1%.
- **Statistical and systematic uncertainties:** The systematic uncertainties related with deficiencies of the MC simulations were estimated by re-calculating the cross section after tuning the MC simulations and comparing the resultant cross sections with the default one's. Gaussian statistics was used to evaluate statistical uncertainties.
- **Bins and cross section measurements:** The suitability of the bins was investigated using bin dependent variables: efficiency, purity and acceptance. These variables depend upon the true values of the kinematic variables, and therefore were calculated using MC. The cross section measurements were compared to different theoretical predications and these agreed well.

## Publication

### As Principle author

- **Measurement of Neutral Current  $e^\pm p$  Cross Sections at High Bjorken-x with the ZEUS Detector**, published in Phys. Rev. D 89 (2014) 072007.
- **Measurement of neutral current cross section at high Bjorken x with the ZEUS detector at HERA**, Published in Pramana-Springer, 79:5,1325-1329, (2012).
- **Measurement of high-Q<sup>2</sup> neutral current deep inelastic  $e^+ p$  scattering cross sections with a longitudinally polarized positron beam at HERA**, published in Phys Rev D 87 (2012) 052014.

- **Energy corrections for inner ring of the calorimeter of the ZEUS detector at HERA**, Proceedings of XVIII DAE HEP symposium, Dec-2008 at BHU, Varanasi (India). Volume 18 (2008).

**As a member of the ZEUS collaboration**

52 publications in reputed international journals.

**Work/Papers/Posters Presented at Conferences:**

- Poster presented in XXV<sup>th</sup> International Symposium on Lepton Photon interactions at high energies, 22-27 August 2011, Tata Institute of Fundamental Research (TIFR), Mumbai, “Measurement of neutral current cross section at high Bjorken  $x$  with the ZEUS detector at HERA”.
- Paper presented in XIX<sup>th</sup> International Workshop on Deep Inelastic Scattering and related subjects, 10-15 April 2011, Newport News (Jefferson Lab), “Measurement of neutral current cross sections at high Bjorken  $x$  with the ZEUS detector at HERA”, to be published in *American Institute of Physics* journal.
- Work presented in XIX DAE HEP symposium, Dec-2010 at LNMIIT, Jaipur (India), “Measurement of neutral current cross sections at high- $x$  with the ZEUS detector at HERA”.
- Work presented in Young Scientist Workshop, July-2009 at Ringberg, Germany, “Systematic studies towards measurement of high- $x$  structure functions of proton with ZEUS detector at HERA”.
- Paper presented in XVIII DAE HEP symposium, Dec-2008 at BHU, Varanasi (India), “Energy corrections for inner ring of the calorimeter of the ZEUS detector at HERA [Volume 18 (2008)]”.
- Poster presented in Chandigarh Science Congress, 14 March-2008 at Panjab University, Chandigarh (India), “Physics with the ZEUS detector at HERA”.

**School/Workshop/Conference/Symposium attended:**

- 22 - 27 August 2011, XXV<sup>th</sup> International Symposium on Lepton Photon interactions at high energies, 22-27 August 2011, Tata Institute of Fundamental Research (TIFR), Mumbai, India .
- 10 - 15 April 2011, XIX<sup>th</sup> International Conference on Deep Inelastic Scattering and Related Subjects (DIS 2010), Newport News, VA, USA.
- 13-18 December 2010, XIX<sup>th</sup> DAE-BRNS High Energy Physics Symposium, LNMIIT, Jaipur, India.
- 19 - 23 April 2010, XVIII<sup>th</sup> International Conference on Deep Inelastic Scattering and Related Subjects (DIS 2010), Florence, Italy .
- 25 - 29 July 2009, Young Scientist Workshop, Ringberg, Germany .
- 14-18 December 2008, XVIII<sup>th</sup> DAE-BRNS High Energy Physics Symposium, Banaras Hindu University, Varanasi, India.
- 14-15 March 2008, Chandigarh Science Congress, Panjab University, Chandigarh, India.

- 16 - 20 April 2007, **XV<sup>th</sup> International Conference on Deep Inelastic Scattering and Related Subjects (DIS 2007)**, Munich, Germany .
- 30 Oct.- 18 Nov. 2006, **SERC school on theoretical particle physics, IISC (Bangalore), India** .

**School/Workshop/Conference/Symposium organized:**

- Executing member of National Conference on Preservation of Environment: Challenges before humanity, 14 March, 2013.

## References

- Prof. Manjit Kaur, Department of Physics, Panjab University, Chandigarh, India  
(manjit@pu.ac.in)
- Prof. Allen Caldwell, Director of Max Planck Institute for Physics, Munich, Germany  
(caldwell@mppmu.mpg.de)
- Prof. Aharon Levy, ZEUS Spokesperson, Tel Aviv University, Israel  
(levy@alzt.tau.ac.il)
- Prof. Halina Abramowicz, Tel Aviv University/MPI Munich  
(halina@post.tau.ac.il)