# Curriculum Vitae


**Dr. Azizur Rahaman, Research Associate**

CDF, MS 318
Fermilab
Batavia, IL 60510

Phone : 630 840 2942
Fax : 630 840 2968
E-mail : rahaman@fnal.gov


## Education:

**Ph.D. in Physics (2002)** *Tata Institute of Fundamental Research, Bombay, India*
Thesis topic : Study of W-boson Properties at LEP-II
Thesis adviser : Professor Atul Gurtu

**M.Sc.in Physics (1995)** *Visva-Bharati University, Santiniketan, India*
Major in Physics with specialization in Solid State Physics

**B.Sc. in Physics (1993)** *Visva-Bharati University, Santiniketan, India*
Major in Physics with Mathematics and Chemistry as additional subjects

## Academic Honors:

**1996-02** Graduate Fellowship at Tata Institute of Fundamental Research.

**1995-96** Fellowship at Saha Institute of Nuclear Physics to study Post-M.Sc.

**1993-95** Visva-Bharati Merit Scholarship to study M.Sc.

**1990-93** Visva-Bharati Merit Scholarship to study B.Sc.

**1988-90** Visva-Bharati Merit Scholarship to study science in pre-university school

## Professional Employment:

**Research Associate (Aug 2002 - Present)** *University of Pittsburgh, Pittsburgh, USA*
I work as Post-Doctoral Research associate for the University of Pittsburgh at the CDF experiment, Fermilab.

I work with the B-Physics group at the CDF experiment and my main interest is to measure the lifetime of B-mesons; study $B_s$ mixing and CP violation. We have developed a new Monte Carlo free method to measure the lifetime of exclusive B-mesons sample collected using CDF's B hadronic trigger. The bias introduced by this trigger is corrected on an event-by-event basis using observed kinematic event variables, without any dependence on Monte Carlo simulation. First, we tested the method on simulated sample of $B_u^- \to D^0\pi^-$ with detailed detector simulation, in particular with a detailed simulation of SVT and triggers and then in a mixture of MC signal and data backgrounds. We blessed the lifetime measurements of B mesons $(B_u^-, B^0)$ from 1 fb$^{-1}$ of CDF data and measured the lifetime ratio.

In the lifetime analysis, I have contributed in writing C++ codes to reconstruct $B_u^- \to D^0\pi^-$ ($D^0 \to K^-\pi^+$), $B_d^0 \to D^-\pi^+$ ($D^- \to K^+\pi^-\pi^-$) and $B_s^0 \to D_s^-\pi^+$ ($D_s^- \to \phi\pi^-$ ($\phi \to K^+K^-$)) decay modes. I have led efforts to skim data for this analysis; optimize the selection cuts; produce Monte Carlo sample needed for this analysis and write user friendly scripts to produce and test the ntuples from skimmed data and MC sample. I have also contributed in developing, testing and cross-checking the root-macros for lifetime fitter program and evaluated some of the systematic errors.

Apart from my direct involvement in research, I also help two graduate students from Oxford University with their analysis work on the lifetime measurement.

My other duties at CDF are (mainly service job):

- Serving as a God-parent at CDF to review the analysis on the measurement of the branching ratio of the Cabibbo suppresed decay $D^+ \to \pi^-\pi^+\pi^+$ for the purpose of publication.
- Determine SVT beamlines in the raw data. This work was done on a priority basis for the use of B-group, specially $B_s$-mixing sub-group.
- Investigate the L1 trigger rate of two track triggers at high luminosity. Based on this study, we proposed several trigger improvements without significant loss of relevant physics data.
- Develop offline silicon detector monitoring tools; I wrote scripts to produce and upload the plots relevant for silicon detector operation and performance to the web on daily basis for the monitoring crews to examine it.
- Worked as a team with the silicon task force group to investigate the wire-bond failure of silicon modules. Our work led to improved measures to reduce such failure.

**Research Scholar (Aug 1996 - Aug 2002)** *Tata Institute of Fundamental Research, Bombay, India*

I worked with the W-physics group at the L3 experiment, LEP at CERN, Geneva, Switzerland. For the first time in L3, I studied the effect of ISR/FSR photon and gluon radiation in the kinematic fit. We obtained an improved W-mass resolution and recovered some of the events which failed ($P(\chi^2) < 5\%$) kinematic fit.

My research involved measuring the production cross-section of the process, $e^+e^- \to W^+W^- \to q\bar{q}e\nu$, at different center-of-mass energies and determining the mass and width of W-boson from $q\bar{q}e\nu$ event sample. My thesis work directly contributed to the W physics results at L3 and further facilitated the LEP combined WW cross section and W mass measurements. My analysis and measurements were presented at different conferences and directly contributed to L3 papers.

For the first two years at the Tata Institute of Fundamental Research, I completed graduate courses. First year of graduate course at TIFR involved taking formal course-work in several modules of advanced level general physics. In the second year course, I completed two experimental projects. In the first project, I studied the light yield of Scintillation Detector for different fiber layouts which was a part of the Research and Development work for Outer Hadron Calorimeter (HO) of the CMS experiment. In the second project, we designed and tested the performance of a neural net to tag b-quark in $Z \to q\bar{q}$ Monte Carlo sample using purely calorimetric information.

## Co-author of about 200 publications by L3 and CDF Collaborations
## Some selected Publications:

**2007:** CP measurements with $B_s$ decays to charm, Presented at CKM 2006, Japan
M. A. Rahaman, KEK Report (proc suppl) to be published.

**2006:** New Results on the $B_c$ Mesons at the Tevatron. Presented at BEACH 2006, UK.
M. A. Rahaman, Nucl. Phys. **B** (proc suppl) to be published.

P. Achard *et al.* [L3 Collaboration], Measurement of the Mass and the Width of the W Boson at LEP. Eur. Phys. J. **C 45**, (2006) 569-587.

**2004:** Wire-bond failures induced by resonant vibrations in the CDF silicon detector
G. Bolla, *et al.*, Nucl. Inst. Meth. **A 518** (2004) 277.

P. Achard *et al.* [L3 Collaboration], Measurement of the Cross Section of W-boson pair production at LEP. Phys. Lett. **B 600**, (2004) 22.

**2000:** M. Acciarri *et al.* [L3 Collaboration], Measurement of the W-pair Production Cross Section and W-Decay Branching Fractions in $e^+e^-$ Interactions at $\sqrt{s} = 189$ GeV. Phys. Lett. **B 496** (2000) 19.

## Selected CDF/L3 Notes:

**2007:** A measurement of the $B^{\pm}$ and $B^0$ lifetime ratio from SVT triggered data using MC free Method. F. Azfar *et. al.*, CDF Note 8757, 2007.

**2004:** Level-I Trigger Rates of the Two-Track Trigger at High Luminosities
Azizur Rahaman and Rolf Oldeman, CDF Note 7370, 2004.

**2003:** A Monte Carlo Independent Method for Lifetime Fits in Data Biased by Hadronic Trigger. F. Azfar *et. al.*, CDF Note 6756, 2003.

**2001:** ISR Photons in W mass analysis using $q\bar{q}e\nu$ events.
A. Gurtu, M. A. Rahaman, L3 Note 2719, November, 2001.

Preliminary Results on the Measurement of Mass and Width of the W Boson at LEP
L3 Collaboration, L3 Note 2637, July, 2000 (Submitted to Winter Conferences 2001)

Preliminary Results on the Measurement of W-Pair Cross sections in $e^+e^-$ Interactions at $\sqrt{s} = 205 - 208$ GeV and W-Decay Branching Fractions
L3 Collaboration, L3 Note 2638, February, 2001 (Winter Conferences 2001)

**2000:** Preliminary Results on the Measurement of W-pair Cross Section and W-decay Branching Fractions at $\sqrt{s} = 192 - 202$ GeV.
L3 Collaboration, L3 Note 2514, March, 2000 (Submitted to Winter Conferences 2000)

**1999:** Preliminary Results on the Measurement of W-Pair Cross Sections in $e^+e^-$ Interactions at $\sqrt{s} = 189$ GeV and W-Decay Branching Fractions.
L3 Collaboration, L3 Note 2376, March, 1999 (Submitted to Winter Conferences 1999)

## Talk/Seminar:

**2007:** "$B_s$ mixing at CDF" WIN 2007, Saha Institute, Kolkata, India.
"Observation of $B_s$ oscillation at CDF" HEP Seminar, Tata Institute, India

**2006:** "CP measurements in $B_s$ decays to charm" CKM 2006, Nagoya University, Japan.
"New Results on the $B_c$ Meson at the Tevatron" BEACH 2006, Lancaster, UK.
"SVT Beamlines in New Data" 10th CDF B-mixing Workshop, Fermilab.

**2001:** "Studies of ISR Photon in Kinematic Fit" Extended Analysis Meeting, CERN.
"Report on $q\bar{q}e\nu$ and $q\bar{q}\mu\nu$ Selections" Annual L3 meeting, Balatonfured, Hungary.
"Selection of $q\bar{q}e\nu$ Events from W-pair Production" HEP Seminar, TIFR, India.

**2000:** "Measurement of W Boson Mass and Width" DAE Symposium, Hyderabad, India.
"Measurement of W-pair Cross Sections" DAE Symposium, Hyderabad, India.
"W-pair in 2000 DATA" L3 General Meeting, CERN.

**1999:** "WW Cross Section and Branching Fractions" Annual L3 meeting, Lyon, France.

**1998:** "Selection of $q\bar{q}e\nu$ events from W-pair production at 189 GeV"
DAE Symposium, Chandigarh, India.

## Workshop/School:

**2001:** LEP W-physics Workshop, Cetraro, Italy.

**2000:** European School on High Energy Physics, Caramulo, Portugal.

**1995:** International School on Surface Physics, Saha Institute of Nuclear Physics, India.

**1994:** 3rd School on Space Astronomy, Tata Institute of Fundamental Research, India.