

Ivan Smiljanić

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Employment

- **Institute of Nuclear Sciences Vinča, University of Belgrade, Serbia**

- Research Assistant Professor, 2019 -
- Senior Associate, 2014 - 2015
- Research Assistant, 2006 - 2014

- **Gymnasium "Sveti Sava" Požega, Serbia**

- Physics Teacher, 2015 - 2019

Education

- **Faculty of Physics, University of Belgrade**

- **PhD**, Department of Theoretical and Experimental Physics, Belgrade, Serbia, October, 2016
Thesis: Method of Luminosity Measurement at the International Linear Collider
Average/Overall Grade: 9,80/10.00 PhD Thesis grade: 10.00/10.00
- **BSc**, Department of Theoretical and Experimental Physics, Belgrade, Serbia, 2000
Thesis: Applicability and Limitations of the b -quark Identification Method Based on AABTAG Program
Average/Overall Grade: 8.07/10.00 B.Sc. Thesis grade: 10.00/10.00

Conferences/Workshops (recent)

Workshops:

- Science Education in School, Galati, Romania, 2017, I held the workshop "Innovative Approach in Scientific Education Using Arduino Platform"
- 12th Congress of Serbian Physicists (KFS 2013), Vrnjačka Banja, Republic of Serbia (in native language): Luminosity measurement at the ILC, conference proceedings: ISBN 978-86-86169-08-2, pp. 252-256 (2013)
- 21st FCAL Collaboration Workshop, CERN Geneva, 12 -14 November 2012, Correction methods for counting losses induced by the beam-beam effects in luminosity measurement at ILC, XXI FCAL Workshop, 2012, CERN
- LCWS12 - International Workshop on Future Linear Colliders, University of Texas at Arlington, Oct. 22 - Oct. 26, 2012, Correction methods for counting losses induced by the beam-beam effects in luminosity measurement at ILC (on behalf of the FCAL Collaboration)
- 20th FCAL Collaboration Workshop, DESY Zeuthen, Germany, 07 - 09 May 2012, Methods for the BHSE correction in luminosity measurement at ILC, XX FCAL Workshop, 2012, DESY-Zeuthen

- 19th FCAL Collaboration Workshop, Belgrade, Serbia, 13. -15. September 2011, Physics background at CLIC, conference proceedings: ISBN: 978-86-7306-114-6, pp. 59-63 (2011)
- 18th FCAL Collaboration Workshop, Predeal, Romania, 30. May – 1. June 2011, Fourfermion Background in Luminosity Measurement at CLIC, conference proceedings: ISBN: 978-973-0-11117-0, pp. 75-78 (2011)

Computing Skills (Analysis/Simulations)

- Statistical analysis: ROOT/PAW
- Programming languages: Fortran, C++, html
- Monte Carlo: GEANT4, MCNP, Whizard, GuineaPig, BHLUMI/BHWIDE
- Databases: MS Access, MS Excel
- Applications (selected): Origin, QtiPlot, MS/Libre Office
- Operating systems: Linux/Unix, Windows

Additional Courses

- Radiation protection level 3
- Radiation protection level 5
- Medical Physics
- MCNPX advanced course
- Radiation Technology
- Detectors (in High Energy Physics)
- Astroparticles
- Numerical Methods in Physics
- Arduino and C++ programming

Language Skills

- English - highest level
- Russian - intermediate level

Research Experience

From the beginning of 2006 until the June 2007, I worked as the **On-call expert for Central Silicon Tracker of the H1 detector at HERA experiment**. HERA was the largest particle accelerator at DESY Hamburg and Germany's largest research instrument. Over a time span of 15 years, the storage ring served the international particle physics community as the world's most precise electron microscope for studies of the proton's inner structure. The HERA storage ring facility at DESY was the only one in the world in which two different types of particles – electrons/positrons and protons were accelerated separately and then brought to collision.

In a 6.3-kilometer-long tunnel located deep below Hamburg electrons/positrons collided with protons at four interaction points, surrounded with four detectors, H1, ZEUS, HERMES and HERA-B. H1, as well as ZEUS experiment observed the high-energy collisions of electrons and protons in order to unravel the inner structure of the proton and the mysteries of the fundamental forces. H1 detector consisted of several different detector components. Its size was about 12x15x10 meters and it weighted 2800 tons. One of the crucial components of H1 detector was the central silicon tracker. Apart from working as the on-call expert, I also performed analysis of measurements done with the Central Silicon Tracker and gave a significant contribution in realization of the H1 experiment with 30 days of 8-hour shifts on the direct control of the whole experiment, until the end of experiment. The engagement in H1 experiment resulted in a number of papers published in leading international scientific magazines.

From 2007, I am working on **Luminosity measurement at ILC and CLIC** and from 2019 also on **Luminosity measurement at CEPC** within the FCAL (Forward Calorimetry) Collaboration. ILC and CLIC are future e^+e^- linear colliders foreseen to be complementary to LHC. CEPC is a future e^+e^- circular collider, also foreseen to be complementary to LHC. These colliders will be used for precision measurements in the Higgs sector, electroweak physics and search for new physics. For luminosity measurement, small angle Bhabha scattering as the dominant QED process at energies that will be available at ILC, CLIC and CEPC will be used. The precision of luminosity measurement is limited both by the reconstruction of Bhabha events and by physics effects, such as beam-beam effects and presence of physics background. For my PhD thesis "Method of Luminosity Measurement at International Linear Collider", focus of my research was put on quantification and correction of systematic effects in integrated luminosity measurement, especially those originating from the interaction of colliding beams, as well as of experimental characterization of the luminometer at the International Linear Collider (ILC). The subject of this research addresses the integrated luminosity measurement with the permille uncertainty. That request implies understanding and correction of a number of complex systematic effects. The most important effects originate from electromagnetic interaction between colliding beams, which changes four-vectors of the initial and final states, resulting in counting loss of the signal in the integrated luminosity measurement. Within the FCAL Collaboration framework, from 2010 I was involved in the FP7- NFRAStructures-2010-1, Advanced Infrastructure for Detectors at Accelerators (AIDA) project. Being involved in luminosity measurement on TeV-energy linear colliders, takes an active part in realization of the Memorandum of Cooperation between the Vinca Institute and CERN for the CLIC Detector and Physics Study, signed in 2012.

Awards

- "Ambassador of Science", Belgrade Science Fair, for the exhibition I prepared with students from Gymnasium "Sveti Sava" Požega, 2018
- 2nd and 3rd prize at the State competition in physics with my student from Gymnasium "Sveti Sava" Požega, 2016 and 2017
- 3rd prize at the Skopje International Science Festival, with students from Gymnasium "Sveti Sava" Požega, 2016

Teaching Experience

- Gymnasium "Sveti Sava" Požega, physics teacher, 2015-2019

List of Publications

- **Research Papers - International Journals:**

- (1) H. Abramowicz, I. Bozovic Jelisavcic, T. Jovin, M. Pandurovic, I. Smiljanic et.al. [FCAL Collaboration], Measurement of shower development and its Molière radius with a fourplane LumiCal test set-up, 28pp, Eur.Phys.J. C78 (2018) no.2, 135.
 - (2) G. Milutinović-Dumbelović, I. Božović-Jelisavčić, C. Grefe, G. Kačarević, S. Lukić, M. Pandurović, P. Roloff, I. Smiljanić, Physics potential for the measurement of $\sigma(H\nu\bar{\nu}) \times BR(H \rightarrow \mu\bar{\mu})$ at the 1.4 TeV CLIC collider, 10pp, Eur.Phys.J. C75 (2015) no.11, 515.
 - (3) H. Abramowicz, I. Bozovic Jelisavcic, T. Jovin, M. Pandurovic, I. Smiljanic et.al. [FCAL Collaboration], Performance of fully instrumented detector planes of the forward calorimeter of a Linear Collider detector, 22pp, JINST 10, P05009, May 2015.
 - (4) I. Bozovic Jelisavcic, S. Lukic, G. Milutinovic Dumbelovic, M. Pandurovic and I. Smiljanic, Luminosity Measurement at ILC, 16pp, JINST 8, P08012, August 2013.
 - (5) S. Lukic, I. Bozovic Jelisavcic, M. Pandurovic, I. Smiljanic, Correction of beam-beam effects in luminosity measurement in the forward region at CLIC, 14pp, JINST 8, P05008, May 2013.
 - (6) H. Abramowicz, I. Bozovic Jelisavcic, T. Jovin, M. Pandurovic, I. Smiljanic et.al. [FCAL Collaboration], Forward Instrumentation for ILC Detectors, 28pp, JINST 5, P12002, December 2010.
- **Proceedings - International Conferences/Workshops:**
- (1) I. Božović Jelisavčić , G. Kačarević, S. Lukić, S. Poss, A. Sailer, I. Smiljanić, Potential and challenges of the physics measurements with very forward detectors at linear colliders, Nucl.Part.Phys.Proc. 273-275 (2016) 1084-1089 pp.
 - (2) G. Milutinović-Dumbelović , I. Božović-Jelisavčić, Christian Grefe, G. Kačarević, S. Lukić, M. Pandurović , Philipp Roloff, I. Smiljanić [CLICdp Collaboration], Measurement of the branching ratios for the standard model Higgs decays into muon pairs and into Z boson pairs at a 1.4 TeV CLIC, AIP Conf.Proc. 1722 (2016) 070006, C15-08-24.3, 2016, 4 pp.
 - (3) I. Bozovic-Jelisavcic, S. Lukic, M. Pandurovic, I. Smiljanic, Precision luminosity measurement at ILC, Proceedings of LCWS13, 11-15 November 2013, Tokyo, Japan, 6pp, <http://arxiv.org/abs/1403.7348>.
 - (4) I. Smiljanic, S. Lukic, M. Pandurovic, I. Bozovic Jelisavcic, Backgrounds at CLIC, Proceedings of the XIX Workshop of the Collaboration on Forward Calorimetry (FCAL) at Future Linear Collider, Vinca Institute of Nuclear Sciences, Belgrade, Serbia (2011), 59- 63pp, ISBN: 978-86-7306-114-6.
 - (5) Sz. Kulis, A. Matoga, J. Aguilar, I. Levy, L. Zawiejski, E. Kielar, O. Novgorodova, H. Henschel, I. Smiljanic, W. Wierba, J. Kotula, A. Moszczynski, K. Oliwa, W. Daniluk, Report on FCAL Collaboration Testbeam, Proceedings of the XIX Workshop of the Collaboration on Forward Calorimetry (FCAL) at Future Linear Collider, Vinca Institute of Nuclear Sciences, Belgrade, Serbia (2011), 21-25pp, ISBN: 978-86-7306-114-6.
 - (6) I. Smiljanic, I. Bozovic Jelisavcic, Four-fermion Background in Luminosity Measurement at CLIC, Proceedings of the 18th FCAL Collaboration Workshop, Predeal, Romania, IFINHH Bucharest - Magurele, Romania (2011),75-78pp, ISBN: 978-973-0-11117-0.
 - (7) I. Bozovic Jelisavcic, H. Abramowicz, P. Bambade, T. Jovin, M. Pandurovic, B. Pawlik, C. Rimbault, I. Sadeh, I. Smiljanic, Luminosity Measurement at ILC, Proceedings of the International Linear Collider Workshop 2010 LCWS10 & ILC10, Beijing 2010, 6pp, arXiv:1006.2539v1 physics.ins-det.
 - (8) I. Bozovic-Jelisavcic, M.Pandurovic, I. Smiljanic, T. Jovin, I .Sadeh, Forward region studies for ILC, Proceedings of the 7th International Conference of the Balkan Physical Union, Alexandroupolis, Greece, 9-13 September 2009, ISBN 978-0-7354-0740-4, pp. 49, 2009.

- (9) I. Smiljanic, I. Bozovic-Jelisavcic, M. Pandurovic, M. Mudrinic, J. Mamuzic, Towards a final selection for luminosity measurement, Proceedings of the International Workshop "FCAL at the ILC", ed. I. Bozovic-Jelisavcic, pp. 52 - 58, INN - Vinca press, Belgrade, Serbia, ISBN: 978-86-7306-095-8(2008).

• **Proceedings - National Conferences/Workshops:**

- (1) I. Smiljanić, I. Božović Jelisavčić, S. Lukić, M. Pandurović, Merenje luminoznosti na međunarodnom linearnom sudaracu, XII Kongres fizičara Srbije, Zbornik radova, ISBN 978-86-86169-08-2, maj 2013, 252-256
- (2) S. Lukić, I. Božović Jelisavčić, M. Pandurović, I. Smiljanić, Korekcija efekata interakcije snopova u merenju luminoznosti na sudaraču CLIC, XII Kongres fizičara Srbije, Zbornik radova, ISBN 978-86-86169-08-2, maj 2013, 216-220

• **Supporting Internal notes:**

- (1) H. Abramowicz, I. Bozovic-Jelisavcic, S. Lukic, M. Pandurovic, I. Smiljanic [FCAL Collaboration], ECFA Detector R&D Panel, Review Report, arXiv:1411.4924 [physics.insdet] , LCD-DET-2013-029, 2013
- (2) S. Lukic, I. Smiljanic, Correction of beam-beam effects in luminosity measurement at ILC, arXiv:1211.6869
- (3) S. Lukic, I. Smiljanic, I. Bozovic-Jelisavcic, M.Pandurovic, Correction of beam-beam effects in luminosity measurement in the forward region at CLIC, LCD-NOTE-2012-008, arXiv:1301.1449
- (4) K. Afanaciev, I. Bozovic-Jelisavcic, M.Pandurovic, I. Smiljanic, T. Jovin et.al. [FCAL Collaboration], Report for the ILC Detector R&D Panel Instrumentation of the Very Forward Region, Editors: J. Aguilar and A. Sailer, R&D Status Report (2009).