Mustafa Mustafa

Specialties: Physics, Data Analysis, C++, ROOT, Linux
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Education

2009-2013 **Ph.D. in High Energy Nuclear Physics**
Purdue University, IN.

Thesis title: Experimental study of electrons from heavy flavor hadrons decays in Au+Au collisions at $\sqrt{s_{NN}} = 200$, 62.4 and 39 GeV in the STAR experiment at RHIC
Advisor: Wei Xie

2004-2008 **B.Sc. in Physics**
University of Jordan, Amman, Jordan.

Current Position

2013-Present **Postdoctoral Fellow**
Lawrence Berkeley National Laboratory,
Relativistic Nuclear Collisions group, Nuclear Science Division.

Focus:
I) Contributing to STAR Time Projection Chamber alignment and calibration R&D.
II) Measurements related to heavy quarks interactions and energy-loss in heavy-ion collisions.
Advisor: Jim Thomas

Skills & Areas of Expertise

CS

Scientific Computing	C++	Mathematica
Monte Carlo Simulations	ROOT	Linux
Data Analysis	Python	Vim

Physics

Heavy-Ion Physics	Quark Gluon Plasma	Heavy Flavor Physics
Mathematical Physics	Mathematical Modeling	

MOOCs
Machine Learning (Andrew Ng)
Statistical Learning (Hastie &Tibshirani)

Projects & Contributions

2012-Present **HFT software. PXL fast and slow simulators deployment (STAR experiment)**

Objective:
Contribution:
Technical skills:
Outcome:

2011-2013 **Measurement of non-photonic electrons at**

Objective:
Contribution:
Technical skills:
Outcome:

2012-2013 **Embedding deputy (STAR experiment)**

Objective:
Contribution:
Technical skills:
Outcome:

2010-2012 **Heavy Flavor PWG Embedding Helper**

Objective:
Contribution:
Technical skills:
Outcome:

2011 **D^* reconstruction efficiency in HFT Simulations (STAR experiment)**

Objective:
Contribution:
Technical skills: Large data analysis, ROOT, C++, grid-computing.
Outcome:

2010-2011 **Measurement of D^0 production in p+p collision at $\sqrt{s}$ = 200 GeV (STAR experiment)**

Objective:	Measurement of charm cross-section at mid-rapidity by direct reconstructing of $D^0 \to K\pi$.
Contribution:	Studying event-mixing techniques in p+p collisions. Cross-checking signal reconstruction. STAR documents.
Technical skills:	Large data analysis, ROOT, C++, grid-computing.
Outcome:	Phys. Rev. D 86, 072013 (2012). arXiv:1204.4244

Talks

Conference talks:

2013/11 **Measurement of non-photonic electrons in STAR experiment**,
EMMI workshop on Heavy Flavor & QCD Phase Structure in High Energy Collisions.
LBL, Berkeley, CA. PDF.

2012/08 **Measurements of non-photonic electrons at STAR experiment**,
parallel talk at *Quark Matter 2012 International Conference*,
Washington D.C. PDF.

Invited talks:

2014/06 **Recent open heavy flavor results from STAR experiment**,
RHIC & AGS Annual Users' Meeting,
BNL, NY. PDF.

2013/06 **Recent open heavy flavor results at RHIC**,
RHIC & AGS Annual Users' Meeting,
BNL, NY. PDF.

2012/10 **Measurements of non-photonic electron in STAR experiment**,
International Workshop on Heavy Quark Production in Heavy-Ion Collisions,
Utrecht, Netherlands. PDF.

2012/08 **Measurements of non-photonic electron in STAR experiment**,
Workshop on Heavy Flavor Production in High-Energy Nuclear Collisions,
UIC, Chicago, IL. PDF.

Seminars:

2014/08 **Measurements of electrons from heavy-flavor hadrons decays in STAR experiment**,
University of Illinois at Chicago,
Chicago, IL. PDF.

Publications

+50 publications. Full list available at Google Scholar or INSPIRE.

Selected experimental physics publications:

2013 *Measurements of non-photonic electron production and azimuthal anisotropy in* $\sqrt{s_{NN}} = 39$, 62.4, *and* 200 *GeV* Au+Au *collisions from STAR at RHIC*.
Mustafa Mustafa (for the STAR Collaboration). Nuclear Physics A 904-905, 665 (2013). arXiv:1210.5199.

2012 *Measurements of* D^0 *and* D^* *production in* p + p *Collisions at* $\sqrt{s}$ = *200 GeV*.
L. Adamczyk et al. (STAR Collaboration). Phys. Rev. D 86, 072013 (2012). arXiv:1204.4244.

Mathematical physics publications:

2011 *Supersymmetry identifies molecular Stark states whose eigenproperties can be obtained analytically*.
M. Lemeshko, M. Mustafa, S. Kais, B. Friedrich. New J. Phys. 13, 063036 (2011). arXiv:1106.4402.

2011 *Supersymmetric factorization yields exact solutions to the molecular Stark effect problem for "stretched" state*.
M. Lemeshko, M. Mustafa, S.Kais, B. Friedrich. Phys. Rev. A. 83, 043415 (2011). arXiv:1105.5262.

2009 *A Venn diagram for supersymmetric, exactly solvable, shape invariant, and Infeld-Hull factorizable potential*.
M. Mustafa, S. Kais. arXiv:0911.4206.

2009 *Effective polar potential in the central force Schrödinger equation*.
M. S. Shikakhwa and M. Mustafa. Eur. J. Phys. 31, 151 (2010). arXiv:1001.3693.

Book chapters:

2009 *General Physics, Electromagnetism Laboratory Manual, 3rd Edition*.
M. S. Shikakhwa, M. Mustafa, R. Al-Rfou', A. Ecevit, M. Ozbakan.
Middle East Technical University, North Cyprus Campus.

Work History:

Research:

2010-2013 **Graduate research assistant. High-Energy Nuclear Physics Group.**
Purdue University, IN.
The primary focus of my research was heavy quarks interaction with the strongly interacting partonic medium created in heavy-ion collisions so-called Quark Gluon Plasma.

2008-2009 **Research assistant. Remote collaboration with Prof. Sabre Kais.**
Purdue University, IN.
Applications of Supersymmetric Quantum Mechanics techniques to problems in Atomic and Molecular Physics. This work has been initiated during my Dec. 2008 research visit to Max Planck Institute for Physics of Complex Systems, Dresden, Germany.

2008 **Research Assistant. Prof. Jameel Khalifeh's group.**
University of Jordan, Amman, Jordan.
Worked on analytical evaluations of lattice Green's functions for isotropic and anisotropic FCC, BCC and SC lattices, where these are applied to evaluate resistance of networks of resistors.

2007 **DAAD Intern.**
Ilmenau Technical University, Ilmenau, Germany.
Developed a Mathematica™ visualization package to be used with an Ada implementation of a Kinetic Monte Carlo simulation of thin film growth package.

Teaching:

2009-2010 **Astronomy laboratory teaching assistant.**
Purdue University, IN.

2008-2009 **Introductory physics laboratory instructor.**
Middle East Technical University, North Cyprus Campus.

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