Curriculum Vitae

Personal Information

Family Name, First Name: Ron, Guy
Date of Birth: Dec. 17, 1975
URL for web site: http://www.phys.huji.ac.il/~gron

Higher Education

2000	B.Sc. - Physics Physics Dept, Tel Aviv University, Israel
2009	PhD - Nuclear Physics Physics Dept, Tel Aviv University, Israel
2009 – 2009	Postdoctoral Research Fellow Particle Physics Dept., Weizmann Institue of Science, Rehovot, Israel
2009 – 2011	Postdoctoral Research Fellow Lawrence Berkeley National Lab. Berkeley, USA

Appointments at Hebrew University

2011 –	Senior Lecturer Racah Inst. of Physics, Hebrew University of Jerusalem, Jerusalem, Israel

Additional Functions at Hebrew University

2014 –	Member of the board of the HUJI library authority.
2013 –	Teaching committee.
2013 –	Faculty representative to the academic library, Faculty of Natural Sciences, Hebrew University
2012 –	Machine shop academic management committee, Physics Dept., Hebrew University
2011 – 2012	Teaching committee member, Physics Dept., Hebrew University

Service in Other Academic and Research Institutions

2013 –	Adjunct Research Assistant Professor Dept. of Physics, The George Washington University, Washington DC, USA

Other Activity

2014 –	Member of the Israeli National Nuclear Physics Committee, Israeli Academy of Sciences, Israel
2011 –	Grant reviewer, Israeli Science Foundation
2009 –	Reviewer for PLB, PRL

Teaching at the Hebrew University

Supervision of Masters and doctoral degree students

Master's Degree Students

- 2011 – 2013, Boaz Lubotzky, "Electromagnetically Induced Transparency and Absorption in Ne*". Degree Completed.
- 2011 – 2013, Ben Ohayon, "Design and Construction of a Novel, Modular, Zeeman Slower for a Ne* Beam". Switched to Direct PhD Track.
- 2011 – 2013, David Izraeli, "Design and Simulation of a Very Low Energy Neutron Polarimeter". Degree Completed.
- 2013 – Present, Tom Segal, "Bunching in an Electrostatic Trap and Production of ^{23}Ne via the (n,p) Reaction". Degree Completed,
- 2013 – Present, Dan Cohen, "Design and Construction of a Frozen Neon Positron Moderator".
- 2013 – Present, Jonathan Mishnayot, "Additive Manufacturing of Scintillating Materials".
- 2014 – Present, Tal Levy, "Construction of a Straw Tube Tracker Detector for the MUSE Experiment".
- 2014 – Present, Daniel Drebin, "Novel solid-state devices for electrostatic confinement and charge sensing of positrons" (Jointly with Dr. Hadar Steinberg).

Doctoral Degree Students

- 2011 – Present,Moshe Friedman, "The Proton Electromagnetic Form Factor Ratio at Very Low Q^2 and a New Extraction of the Proton Radius".
- 2013 – Present, Ben Ohayon, "Magneto Optical trapping of Radioactive Neon Isotopes".

Post-doctoral Fellows

- Dr. Jonathan Dumas, Design and Construction of a Low Energy Positron Beam Line Based on a Frozen Neon Moderator, July 2013 – Present. Research conducted in my lab.
- Dr. Aidan Kelleher, Design and Construction of a Low Energy Positron Beam Line Based on a Frozen Neon Moderator, July 2011 – July 2013. Research conducted in my lab.
- Dr. Ran Shneor, Simulations of a Very Low Energy Neutron Polarimeter and the Proton Form Factor Ratio at Low Q^2, 2011-2012. Research conducted in my lab.

Visiting Scientists

- Prof. Stuart Freedman, UC Berkely & Lawrence Berkeley National Lab, Berkeley, USA - Lady Davis Fellowship Trust (Nov-Dec 2011).
- Prof. Alexander Milstein, Budker Institue of Nuclear Physics, Novosibirsk, Russia - Lady Davis Fellowship Trust (Dec 2012 - Jan 2013).
- Prof. Mark Raizen, UT Austin, Texas, USA - Bat-Sheva Fellowship (Nov 2013).
- Prof. Savely Karshenboim, Max-Planck-Institut fr Quantenoptik, Garching, Germany & Pulkovo observatory, Russia - Bat-Sheva Fellowship (March 2014).
- Prof. Savely Karshenboim, Max-Planck-Institut fr Quantenoptik, Garching, Germany & Pulkovo observatory, Russia (October 2014).

Courses Taught

2011 – 2014	Introduction to Particle Physics, B.Sc. Class.
2012	Experimental Methods in Electroweak Interactions, B.Sc./M.Sc. Seminar.
2012	Introduction to Particle Accelerators, B.Sc./M.Sc. Class.
2012 – 2014	Mechanics and Special Relativity, B.Sc Class.
2014	Physics for Decision Makers, Cornerstone (Avnei Pina) Class.

Fellowships and Awards

2012	Golda Meir Fellow, Hebrew University
2012	Runner-up, Nuclear Physics Thesis Award, European Physics Society
2011 –	Samuel Sigfried Wolf Lecturer in Nuclear Physics, Hebrew University
2009 – 2010	Rotschild Postdoctoral Fellowship Award
2009	JLab/JSA Best graduate thesis prize
2009	Dean's postdoctoral fellowship, Weizmann Institute of Science, Israel
2008	Jehuda Eisenberg Fellowship, Tel Aviv University, Israel
2007	Joseph Dotan Fewllowship, Tel Aviv University, Israel
2007 – 2009	Adams PhD Fellow, Israeli Academy of Science, Israel

Organization of Scientific Meetings

2016	Local Organizing committee, "Precision Physics of Simple Atomic Systems", Jerusalem, Israel
2012	Co-organizer of the "Workshop on Fundamental Interactions in Traps" at The Weizmann Institute of Science
2009	Co-organizer of the "Workshop on Traps for SARAF" at The Weizmann Institute of Science

Membership in Scientific Societies

2006 –	American Physical Society, USA
2006 –	Israeli Physical Society

Funding Profile

On-going Grants

Project Title	Funding Source	Total Amount (Euro)	Period	Role
Development of a prototype detector assembly for the MUSE experiment	NSF (Rutgers sub award)	152K$ / 600K$	2014-2015	PI
Additive Manufacturing Using Scintillating Materials	Internal HUJI	25K$ / 25K$	2014	PI
Production of Rare Isotopes at SARAF	IAEA	30K	2012-2015	Co-PI
Testing the standard model with trapped radioactive isotopes	ISF	190K + 170K for Equipment	2011-2015	PI
Electrostatic trapping of radioactive ions	BSF	50K / 115K	2011-2015	Co-PI
Slow Positron Beam	MOST	130K / 260K	2012-2014	Co-PI
Calculations and Simulations for Prompt Fission	IAEA	15K / year	Ongoing	PI
A Laboratory for Accelerator Based Nuclear Physics at SARAF	IAEA / Pazi	110K / 550K	2014-2018	Co-PI

Applications

Project Title	Funding Source	Total Amount (Euro)	Period	Role
Novel directions towards precision measurements of the $\beta\nu$ correlation	IAEA / Pazi	30K / 90K	2015–2018	Co-PI
3D Printed Optical Boards	Internal HUJI	50K$	2015	Co-PI
Testing the Standard Model Using Trapped Rare Isotopes	ISF	1.67MNIS	2015-2019	Co-PI
Collaborative Research: Equipment for and running of the PSI MUSE Experiment	NSF + BSF	6.7M$	2015-2020	Co-PI
Novel solid-state devices for electrostatic confinement and charge sensing of positrons	ISF-FIRST	1.18MNIS	2015-2018	Co-PI

Expired Grants

Project Title	Funding Source	Total Amount (Euro)	Period	Role
Neutron Modification in the Nuclear Medium	GIF	30K	2012	PI
Electromagnetically Induced Transparency in Metastable Neon	Israeli DOD	12K / 23K	2012	Co-PI

Scientific Biography

During my graduate studies (direct track PhD at TAU, supervisor - Prof. Eli Piasetzky) I conducted a measurement of the scattering of polarized electrons off a proton target. The recoil proton polarization may be used to accurately calculate the proton elastic form factor (FF) ratio. Previous measurements have shown inconclusive indications of a deviation of the form factor ratio from unity, indicating a different spatial distribution of the electric and magnetic charges of the proton.
I conclusively showed a strong deviation from unity of the FF ratio at low Q^2, also, by combining the analysis with high precision cross section measurements, I demonstrated that the suppression of the FF ratio is caused by a decrease in the electric FF relative to the common fits and calculations [PRL **99**, 202002 (2007)]. With Prof. Gerald Miller (UW) we published a combined theoretical and analysis paper showing that the proton transverse RMS magnetization density extends further than the RMS charge density [PRL**101**, 082002 (2008)].
Based on these results I led the proposal of a high precision experiment at JLab to measure the proton FF ratio to **very** low Q^2 with much greater precision. For this experiment, I modified an existing technique to create a novel method to measure the form factor ratio using Beam-Target Asymmetry which removed almost all of the systematic uncertainties. **This is the first ever experiment to be led by a graduate student at Jefferson Lab, and is also one of the experiments with the shortest time from proposal to data taking.** No other experiment at Jefferson Lab has, to the best of my knowledge, been since successfully initiated and led by a graduate student. I note that my PhD advisor had little, if any, involvement in the proposal and the experiment itself, other than being a part of the collaboration.
The first part of the experiment took place in 2008, and was analyzed by X. Zhan, a graduate student from MIT. I was heavily involved in supervising the analysis and thesis work by X. Zhan. Results from this experiment [PLB **705** (2011) 59-64] have confirmed the strong deviation from unity and have ruled out any hints of a narrow structure in the FF ratio. Based on the results from this part of the experiment I reanalyzed the data from my thesis experiment and published an archival paper [PRC **84** (2011) 055204]. The second part of the experiment ran during 2012, in which we used a novel analysis technique in conjunction with a polarized target which will allow the world's best measurement of the proton FF ratio down to very low Q^2. Data from this experiment is currently being analyzed by my Ph.D. student, Moshe Friedman at Hebrew University.
Analysis of the proton FF ratio also led us to consider the effect of the nuclear medium on the nucleons. Together with Dr. Clöet, Prof. Miller, and Prof. Piasetzky we predicted the effect of the medium on the neutron to be widely different than for the proton [PRL **103**, 082301 (2009)]. A program to test the effects of medium modification on the nucleons was initiated by myself and Prof. Piasetzky at the MAMI accelerator facility at Mainz. A first experiment, to measure possible modifications of highly bound protons in the deuteron has already taken data and is being analyzed by Prof. Piasetzky's student together with one of my students.
In addition to my research efforts in the field of hadronic physics, I also run several programs to test the standard model. For my postdoc work at LBNL (Advisor: Prof. Stuart Freedman) I was involved in running a magneto optical trap for ^{21}Na atoms to search for beyond standard model effects. In addition I was in charge of constructing a fully electrostatic trap (based of a design by Prof. Zajfman at the Weizmann Institute), which will soon be used to trap radioactive ions. As part of the construction process I developed a novel technique to coat vacuum beam line components with NEG material in order to improve their vacuum properties [JINST **5** (2010) P12007]
At the Hebrew University, where I am now an Asst. Prof., I am now constructing a magneto optical trap for radioactive neon isotopes which will be used to study possible standard model modifications. As part of the lab construction I have become interested in several atomic physics issues, such as electro-magnetically induced transparency. In addition, I continue to be active in the electrostatic trapping program, and hold a joint grant (where I am the lead PI), with Prof. Michael Hass from the Weizmann Institute, and Prof. Stuart Freedman, from UC Berkeley and LBNL, to develop a program to study the decay of trapped radioactive ions. As part of the research on this setup, together with my graduate student, we were able to recently show [JINST **8** (2013) P02016] a method for optimizing Zeeman slowers that will provide significant improvements over the currently used schemes. As an aside to this project I collaborated with Dr. Nadav Katz (HUJI) on an experimental effort to show, for the first time, Electromagnetically Induced Transparency in metastable neon vapor. A publication detailing the results of this project has been recently submitted.

The production of relevant radioactive species of neon, and the transport system that will be used to transport them to the magneto-optical trap is currently under investigation by one of my students. Recently (Apr. 2014) we have demonstrated the applicability of the relevant production mechanism for ^{23}Ne (the first isotope to be studied), and expect to submit results for publication within the next few months.
In order to allow for the experimental efforts to take place, the system will be coupled to an accelerator that will produce the radioactive isotopes to be studied. This will be accomplished at the SARAF accelerator currently under construction of the Soreq Research Facility. As part of the efforts to secure available lab space for these experiments I am the co-PI on an equipment grant that has been awarded 5 MNIS for the acquisition of beam line element needed to construct a production target facility. In addition, the Israeli Atomic Energy commission has agreed to allocate relevant construction funds (about 2 MNIS) for the construction of a target facility and several lab spaces (to be completed by end of 2015). Two of these lab spaces will be allocated to the magneto optical trap experiment and to the electrostatic trap experiment.
Finally, I am now leading, together with Prof. Piasetzky and Dr. Sharon Beck (from NRCN) in program to design and construct a slow (∼40kV) positron beam, based on a solid neon moderator, at the Hebrew University. This system will allow probing of material properties using novel techniques, not currently employed in Israel. As part of this research I am collaborating with Dr. Hadar Steinberg (HUJI) in a project to introduce single charge event detection techniques to the field of positron annihilation spectroscopy.
I am the spokesperson and co-originator for several large scale experiments, taking place in facilities worldwide. Among these experiments are: A new measurement of the proton charge radius using muon scattering in an attempt to resolve the proton radius puzzle; a new, high-precision, measurement of the proton form factor ratio using a novel polarized beam-polarized target technique; several experiments to examine the modification of the proton in the nuclear medium; and experiments testing the accuracy of Quantum Electro-Dynamics by examining higher-order QED processes.
Spokesperson on experiments/proposals:

- **JLab Experiment E08-007:** A Measurement of the Proton Form Factor Ratio Down to Very Low Q^2.
- **PSI Experiment R-12-01.1:** Studying the Proton "Radius" Puzzle with μp Elastic Scattering (**MUSE**).
- **MAMI A1/Mainz Experiment:** A Measurement of the Medium Modification of Highly Bound Protons in Deuterium.
- **HIγS Facility:** A Measurement of the Bethe-Heitler Pair Production Asymmetries.
- **MAMI A1/Mainz:** Neutron Properties in the Nuclear Medium Studied by Polarization Measurement.
- **MAMI A1/MESA:** A Measurement of the Bethe-Heitler Pair Production Asymmetries.
- **MAMI A1:** Measurement of the Medium Modification of Protons Bound in Different Shells of ^{12}C.
- **MAMI A2:** Searching for rare events in the decay of π^0 mesons.

Over the next few years my main research plans are as follows:

- Complete construction of the neon-magneto optical trap for neon isotopes and move the setup to the new lab at SARAF.
- Complete construction of the electrostatic trap (at WI) and move the setup to the new lab at SARAF.
- Initiate measurements of the $\beta\nu$ correlation coefficients for neon and helium using the magneto-optical and electrostatics traps, respectively.
- Construct part of the detector setup for the MUSE (muon proton scattering) experiment and install at the Paul Scherrer Institute.
- Run the MUSE experiment and extract a new value for the proton radius, potentially solving the proton radius puzzle.
- Perform a Bethe-Heitler energy asymmetry measurement at the HIγS facility at TUNL (Duke U.) and extract the higher-order QED contributions.
- Measure the effects of the ^{12}C nuclear medium on the bound protons at MAMI/A1.

In addition to these main efforts I will continue to be involved in several other experiments which take place on longer time scales, as well as finalize (together with students from HUJI and TAU) the analysis for several experiments that have already taken data at JLAB and MAMI.