DMITRIY PAUTOV

Physics student interested in semiconductor physics & physics BSM, with proven technical skills.
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WORK EXPERIENCE

Physics Intern, Gabrielse Group at Northwestern University Evanston, IL | Jun 2023 – Aug 2023

- Contributed to making the most precise measurement of the electron's magnetic moment in search of new physics.
- Re-designed a narrow digital bandpass filter, improving on work done by a graduate student 20 years ago.
- Designed a PCB in KiCad with an STM32H7 MCU, utilizing integrated ADC, DAC, and the core to perform a DFT. Achieved sub 1Hz bandwidth and sub 20 ms processing time. Featured Ethernet, USB-C, an LCD Display, and other I/O for intuitive, versatile, and convenient control for future researchers.
- Prepared, cleaned, assembled, and tested parts for cryogenic, high vacuum, and ultra-high vacuum systems.
- Worked with undergraduate students, graduate students, post-graduates, and professors. Presented work at weekly meetings, took constructive feedback, and collaborated with other ongoing projects.

Project Lead, UIUC EV Concept Car Urbana, IL | Aug 2024 – Present

- Lead a team of 5 to implement regenerative and rheostatic braking systems for an electric vehicle prototype.
- Designed multiple PCBs in KiCad, including high-current and aluminum boards for high-current applications.
- Implemented CAN bus, STM32 microcontrollers, 30A buck converters, 3kw resistors, and an ultracapacitor bank.
- Participating in the 2024 Shell Eco-marathon, fostering innovation in the electric car automotive field.

SELECTED PROJECT

Turbomolecular Pump Driver

- Created a custom variable frequency & voltage inverter for driving Turbomolecular Vacuum Pumps (TMPs).
- Designed a mains voltage-powered PCB, centered around an STM32 MCU controlling a 6-step inverter powered by 120VDC with a PWM signal. Speed & Temperature Control is achieved through the back EMF of the TMP.
- Implemented a control algorithm in C++ for ramp-up; guaranteed that TMP could not crash due to circuit failure.
- Over a dozen successful pump downs to <10^-6 Torr, with no vibration of TMP at full speed.

LEADERSHIP EXPERIENCE

Fencing, Team Captain Aug 2020 - Feb 2024

- Led over 60 people in daily practice, training general strength, endurance, and technical skills in fencing.
- Became one of the Top 4 fencers to join the varsity team, and led the team to 2 victories in the Great Lakes High School Fencing Championship. Fenced at national-level competitions.
- Referred to dozens of local, regional, and national tournaments. Earned 'R1' referee rating, the highest level of regional refereeing, capable of referring to national events.

EDUCATION

University of Illinois Urbana-Champaign Champaign, IL | Expected May 2028
Physics, B.S.

Adlai E. Stevenson High School Lincolnshire, IL | May 2024
High School Diploma

Relevant Coursework
Multivariable Calculus, Linear Algebra, Differential Equations, Statistics, Theory of Semiconductors and Semiconductor Devices, Relativity, Mechanics, Electricity and Magnetism, Quantum Physics, Thermal Physics, Intro to Computing, General Chemistry

SKILLS

Technical: CAD modeling with Inventor & Fusion 360, Analog & Digital Circuit Design, Circuit Simulation with LTspice, PCB Layout with KiCAD, Embedded System Programming with C++, Android app development with Android Studio & Java, PData Analysis and Scripting with Python, LaTeX, LABVIEW

Languages: Native fluency in English and Russian; Basic Proficiency in Spanish