

Department of Physics and Materials Science

Holiday 2024-2025 Newsletter

Dear friends, colleagues, and alum,



Once again, I am very pleased to be able to bring to you a summary of the accomplishments and achievements of our faculty and students from the fall semester. We had a very busy and successful semester with a lot to be proud of! I also would like to give Dr. Kei Nagai a warm

welcome to the department!

Firouzeh Sabri, Professor-Chair

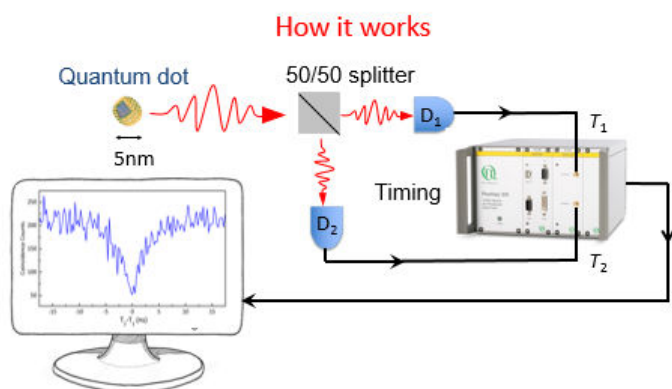
Faculty Member Performs Single-Photon Experiment



Dr. Thang Hoang, an associate professor in DPMS, generated a single-photon from a CdSe quantum dot and detected it.

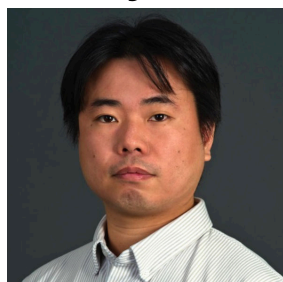
The process is as follows:

1. A single quantum dot (an artificial atom) emits a ONE photon at a time.
2. The emitted photon is randomly sent to either detector D_1 or D_2 at a time, not both.
3. A timing module will detect arrival times T_1 and T_2 at detectors D_1 and D_2 .
4. A computer software generates a histogram showing the coincident counts between two detectors vs. time difference $T_2 - T_1$.



Such a photon can be used as a quantum bit (qbit) for quantum computing.

Faculty Gives NED Talk



Dr. Kei Nagai, an assistant professor in DPMS, presented a NED talk on October 25. The NED Talk is given at Ned The title of his talk is "Peering Inside the Proton: Nucleon Structure and Beyond." We are pleased to see

Dr. Nagai sharing his expertise and insight with our larger campus community during his first semester at the UofM.

The NEDtalks Research Forum is held at the Ned McWherter Library. For more information, please visit <https://www.memphis.edu/libraries/about/nedtals.php>

Faculty Gives Keynote Address; Awarded Research Grant



Dr. Benjamin Keller, an assistant professor in DPMS, was awarded a grant from the National Aeronautics and Space Administration (NASA) for his project "Portable and Reproducible Initial Conditions for Galaxy

Simulations."

Materials Day at the UofM



The fourth annual Materials Day was held at the FedEx Institute on October 18, 2024. The event was organized by the Institute of Nanomaterials Development and Innovation at the University of Memphis (INDIUM) and sponsored by the FedEx Institute. **Dr. Sanjay Mishra** (above left) is the INDIUM Director and **Dr. Mohamed Laradji** (above right) is an Associate Director of INDIUM.

Several members of DPMS presented their work. **Dr. Shawn Pollard** (left) was the keynote speaker, giving a talk entitled, "Thin film engineering for the design and manipulation of magnetic solitons". DPMS graduate students **Justin Brutger**, **Alisha Dhakal**, **Jolaikha Sultana**, **Himal Pokhrel**, **Liyan Jacob**, **Yagya Woli** and **Azim Farhan** gave oral presentation on their work. Posters were presented by current DPMS graduate students **Jordan Darling**, **Debendra Timsina**, and **Afsana Sharmin**, as well as DPMS Research Specialist **Martina Rodriguez Sala**. Additionally, DPMS alumni **Dr. Yu Zhu** and **Haosheng Wen** also presented posters on their research.



For more information, please visit the event homepage (www.memphis.edu/indium/materials-day/index.php).

CU*IP Held at UofM January 2025

The Conference of Women and Gender Minorities in Physics (CU*IP, previously CUWiP) will be held in Memphis from January 24 to 26 at the UofM Campus. We are expecting 115 students to attend. During the conference, conference participants will have opportunities to network, learn about graduate schools, career opportunities in physics and learn more about the wonder of physics, as well as experience a taste of Memphis.

The conference is national with about 14 regional hosts, of which the UofM the host in our region for the first time.



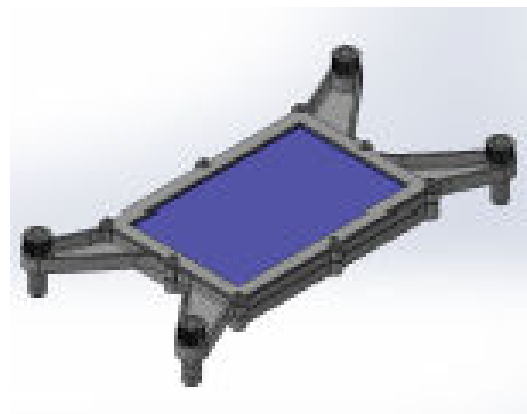
Dr. Samuel Mensah is Chair of the conference committee, and most of the faculty and graduate students are involved in the preparations and to welcome the students to this physics conference.

Student Spotlight—Justin Williams



During summer 2024, UofM Physics and Materials Science student **Justin Williams** participated in an internship through the Naval Enterprise Program at Naval Undersea Warfare Center (NUWC at Newport). Justin expressed that the in-

ternship "helped me visualize and gain practical experience how the different topics I had learned in class... Many of these topics that I learned in the classroom became more complex when in a laboratory setting." We hope that this interview will provide useful information and encouragement for students interested in pursuing internships. For more information, please read the the entire interview at www.memphis.edu/physics/student_spotlights/justin_williams.php.



Drawing of the setup Justin developed and tested during his time at NUWC-Newport.

DPMS Faculty Celebration

The Physics Faculty held their Annual Holiday Party at Mulan's to celebrate the end of the semester, swap gifts and look forward to what the future will bring.



Happy Holidays!!!



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