

# Spring 2025 Physics Colloquium

Monday, January 27<sup>th</sup>

10:00 AM

PAS 201 or Zoom

(<https://arizona.zoom.us/j/81283840289>)

## Pooja Siwach

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### Bridging Nuclei with Qubits: A New Dawn for Nuclear Physics

**Abstract:** The atomic nucleus, composed of protons and neutrons, is fundamental to understanding the basic forces and laws that govern the universe. However, the complex quantum many-body nature of nuclear systems presents a significant challenge for conventional computers when it comes to accurate simulations. Quantum computers, harnessing the principles of quantum mechanics, offer a powerful alternative for simulating these systems more efficiently and with greater precision.

In this talk, I will present how quantum computing can be applied to nuclear physics simulations, focusing on strategies to overcome the limitations of today's noisy intermediate-scale quantum (NISQ) devices. I will present methods for maximizing the potential of current quantum hardware despite its imperfections and demonstrate how these approaches can lead to breakthroughs in understanding key nuclear phenomena—from the structure of atomic nuclei to the formation of elements and beyond.

*\* Refreshments served in PAS 218 at 9:30 AM – 10:00 AM \**

