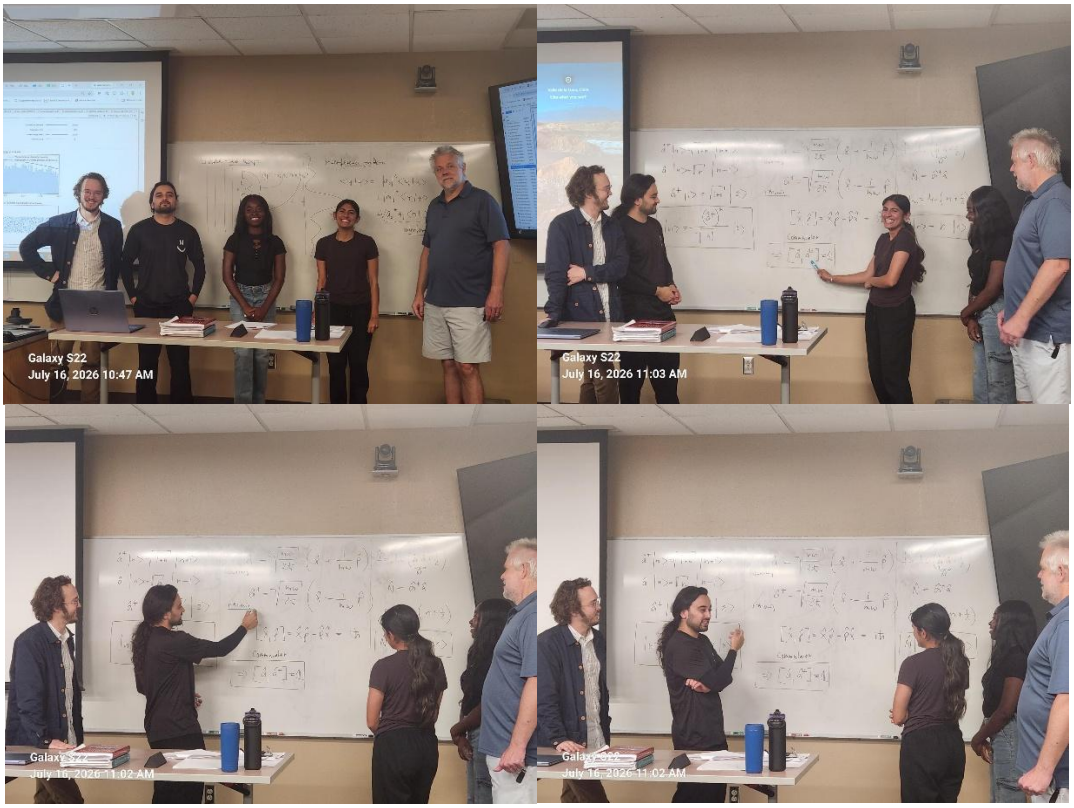
Dr. Boris Kiefer, NMSU developed and delivered Quantum Lectures at CHTM/UNM

Event: 07/16/2026, 10-12pm.

“Foundations of Quantum Mechanics” and

“Quantum Photonics -- Quantized Light and Linear Optical Transformations”

Summary: A foundational quantum mechanics and quantum photonics instructional module was developed and delivered to a mixed cohort of three graduate students and one high-school student on July 16, 2026, at CHTM/UNM. The activity introduced quantum states, superposition, probabilistic measurement, interference, harmonic-oscillator ladder operators, and their extension to quantum photonics. It also included an interactive double-slit simulator (https://github.com/boriskiefer/sim_double_slit) developed for the lecture to illustrate single-photon detection statistics, interference visibility, and the distinction between coherent quantum amplitudes and classical probability mixtures. The resulting illustrated lecture notes and simulator constitute reusable educational products, while photographs document participant engagement and delivery. The formal lecture was followed by an approximately one-hour discussion with the students on Mach–Zehnder interferometer meshes, universal unitary decomposition, and potential technological applications of quantum photonics. The inclusion of a high-school student extended the activity beyond graduate training to support the quantum-workforce pipeline and early exposure to quantum science.



Photos: Top left: participants at the 07/16/2026 Quantum lecture by Dr. Kiefer, the screen in the background to the left shows the double-slit simulator used during the lecture. Top right: High School student inquiring about commutator relation. Bottom left: Graduate student explaining the introduction of ladder operators in the quantum treatment of the harmonic oscillator. Bottom right: discussion among the lecture participants about the connection between quantum harmonic oscillator and quantum photonics.