OUTCOMES OF MSU'S "QUANTUM LITERACY TEACHERS TRAINING" WORKSHOP (QLT2)

CSAAPT Fall 2024 Conference
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Context

- In June of 2024, for five days, Morgan State University hosted a free, in-person, weeklong summer workshop for teachers entitled “Quantum Literacy Training for Teachers”, or QLT^2 for short.
- Five teachers participated, with various STEM backgrounds
- Each teacher received a box of supplies for their classrooms

Goals and Motivation

- Morgan State's Physics Department supports high school teachers who want to embed quantum concepts in their curriculum that do NOT rely on advanced mathematics.
- The project is designed to develop confidence and expand knowledge of QIS principles.
- MSU provides mentors, equipment, and opportunities to "practice“ what attendees have learned with other peers

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Target Audience

- Pilot program, targeting STEM Teachers in the Baltimore Metropolitan area
- 5 attendees
- Fields: chemistry, math, physics, physical and computer science

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Materials


PERIMETER
INSTITUTE


Quantum
FOR ALL


MORGAN
STATE UNIVERSITY


UNIVERSITY OF
WATERLOO
IQC
Institute for
Quantum
Computing

Structure

Morning session 9:00 – noon

- Interactive lesson and activities intertwined

Lunch break

Afternoon session 1:00 – 3:30 pm

- Visit/Tour of labs and facilities
- Activities

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Schedule and Topics

Day 1

1. Waves
2. Wave vs. particle behavior
3. Wave-particle duality
4. Is the world quantum or classical?

Day 2

1. Activity: Wave Models
2. Orbitals and wave functions

Day 3

1. Quantum Sensing/Polarization
2. Uncertainty Principle

Day 4

1. Polarization
2. Malus Law

Day 5

1. Mach-Zehnder Interferometer
2. Quantum Coin Toss & QKD

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My Experience as a Facilitator

Techniques

- **Assumed no previous background**
- Spiral teaching
- Seamlessly and organically weaved instruction and small activities
- Expanded week (5 days)
- Tours showed applications of content discussed

- **Questioning: "Where would this fit into your curriculum?"**

Observations

- **Group dynamics:** from teacher/student to peers learning from each other
- **Learning curve:** exponential
- **Curriculum integration:** various perspectives, including adaptations to the various rigor levels

- Confident and comfortable with equipment/labs
- Tours presented by grad students were inspirational to teachers

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Conclusion

- **Positive feedback:** genuine interest in sharing information with students
- **Lab visits:** reinforced content, provided context and were inspirational for teachers
- **Plans:** expand the workshop next summer to a larger number of teachers.

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Thank You

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