Eddleman Quantum Institute
University of California, Irvine
https://eqi.uci.edu/

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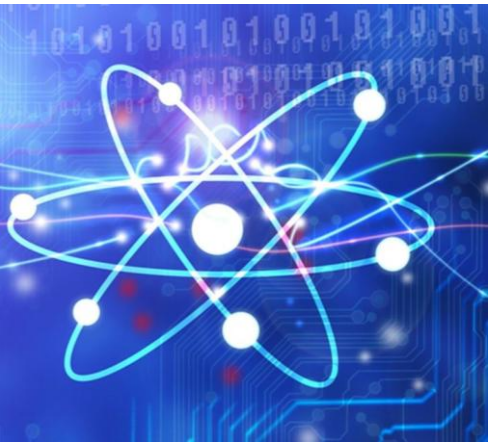
Technology & Dark Fiber Project Overview from UCI

NEWPORT BEACH PUBLIC LIBRARY



Donn Silberman
Quantum Optics Institute of Southern California
www.qoisc.org/pqn-for-oc

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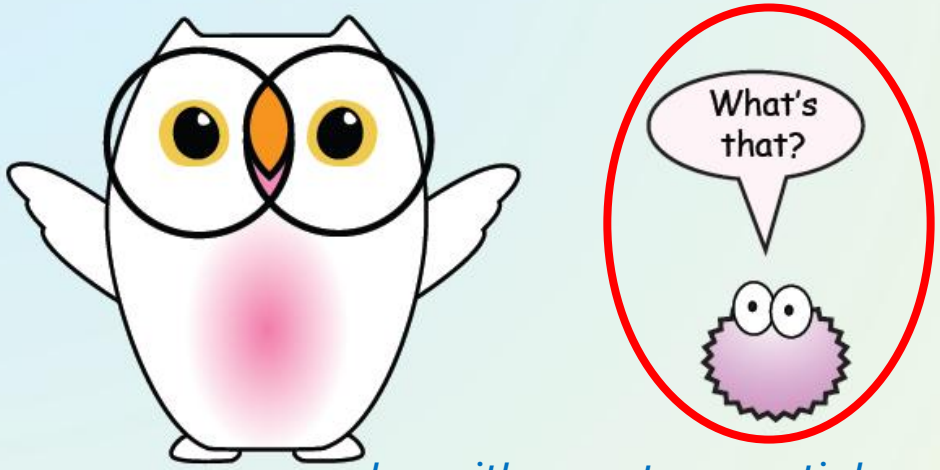
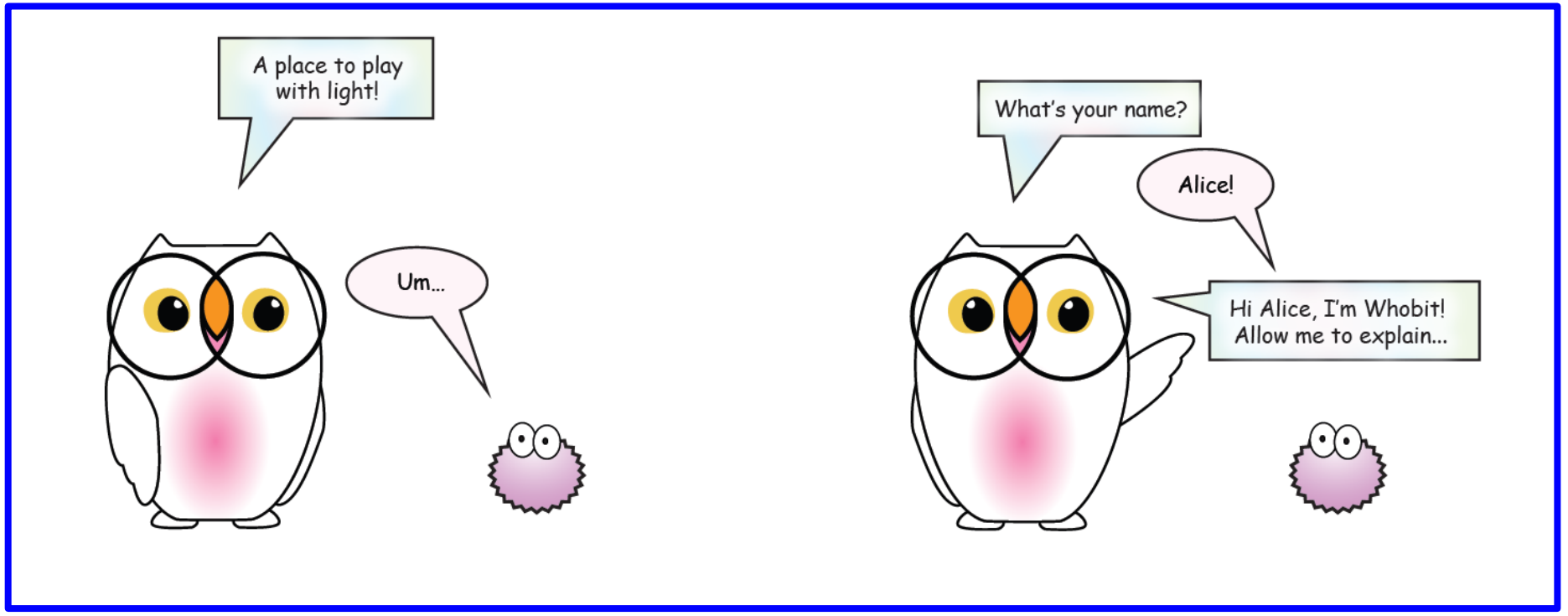
QUANTUM OPTICS INSTITUTE OF SOUTHERN CALIFORNIA

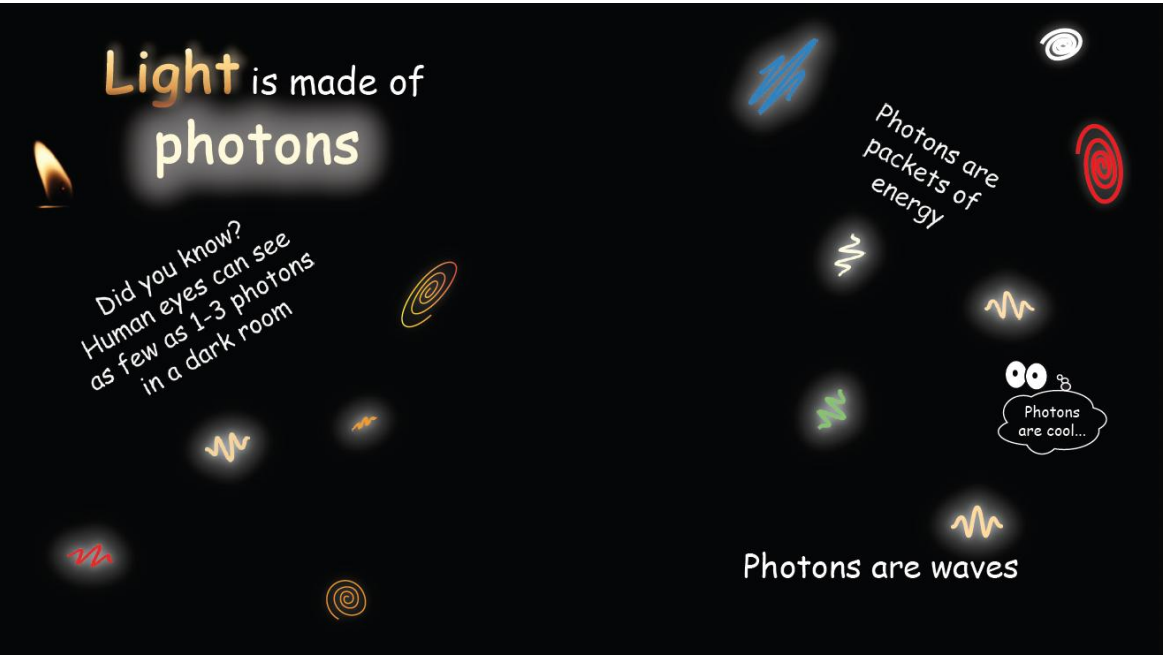
UNIVERSITY OF ILLINOIS URBANA-CHAMPAIGN

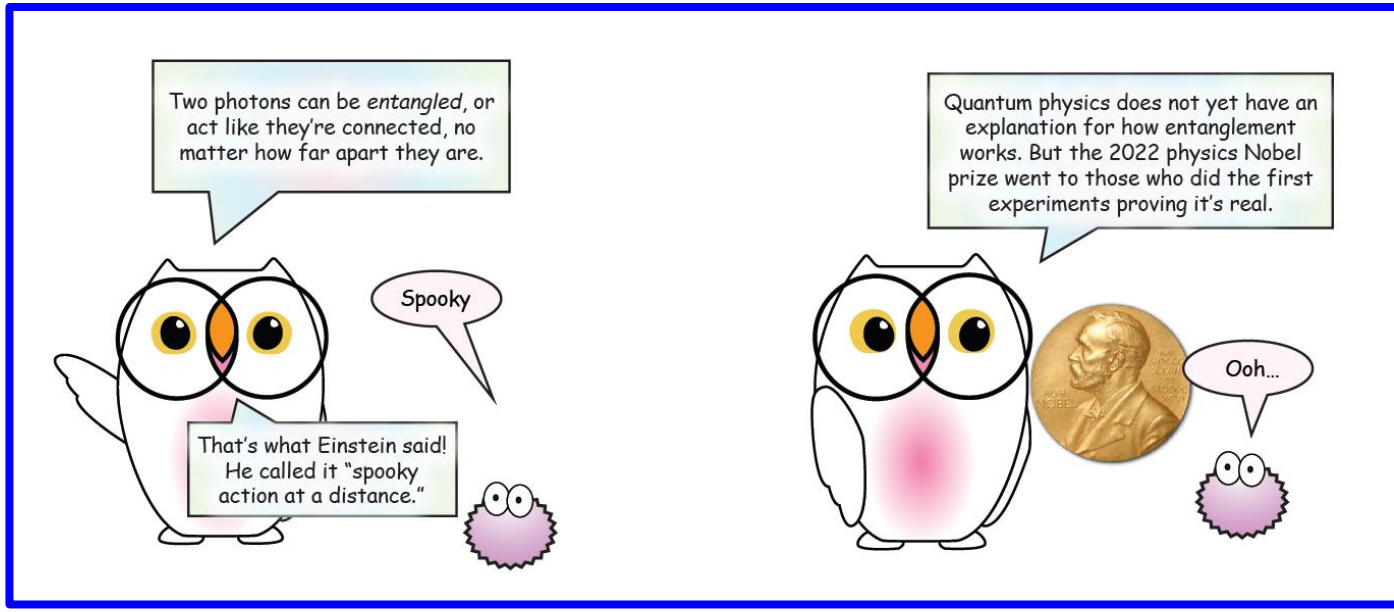
Welcome to the PUBLIC QUANTUM NETWORK



Where everyone can play with quantum particles.
Come explore with us!


A place to play with light!
Um...
What's your name?
Alice!
Hi Alice, I'm Whobit! Allow me to explain...


Light is made of photons
Did you know? Human eyes can see as few as 1-3 photons in a dark room
Photons are packets of energy
Photons are cool...
Photons are waves

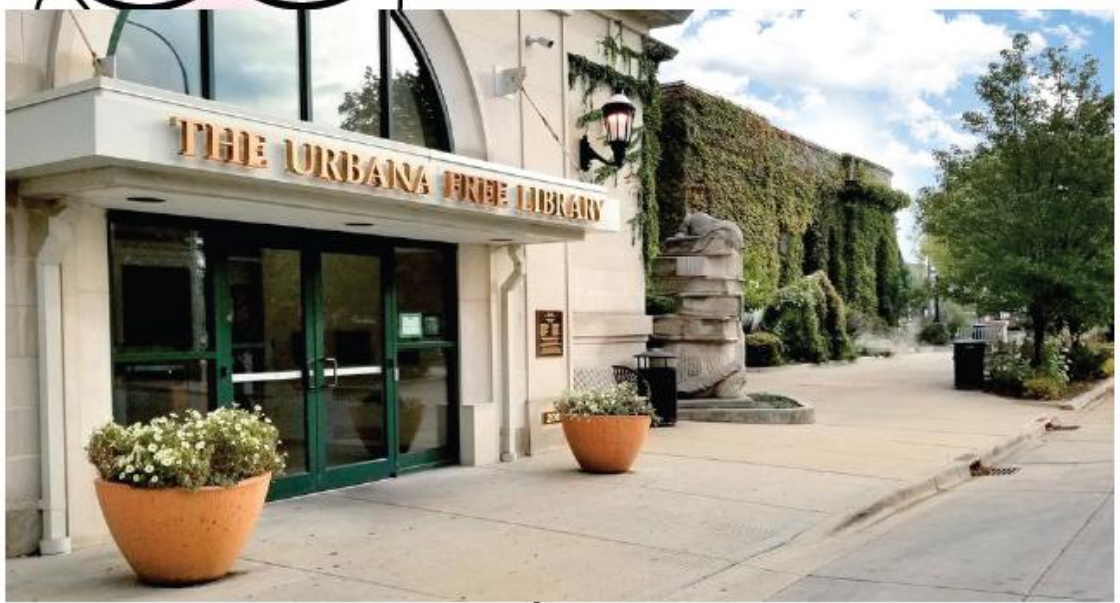

Two photons can be *entangled*, or act like they're connected, no matter how far apart they are.
Spooky
That's what Einstein said! He called it "spooky action at a distance."
Quantum physics does not yet have an explanation for how entanglement works. But the 2022 physics Nobel prize went to those who did the first experiments proving it's real.
Ooh...

The Grainger College of Engineering

Illinois Quantum Information Science and Technology Center

Entangled photons are all around us, but it's hard to study them in the wild. The Public Quantum Network brings entangled photons to public spaces for people to play with.

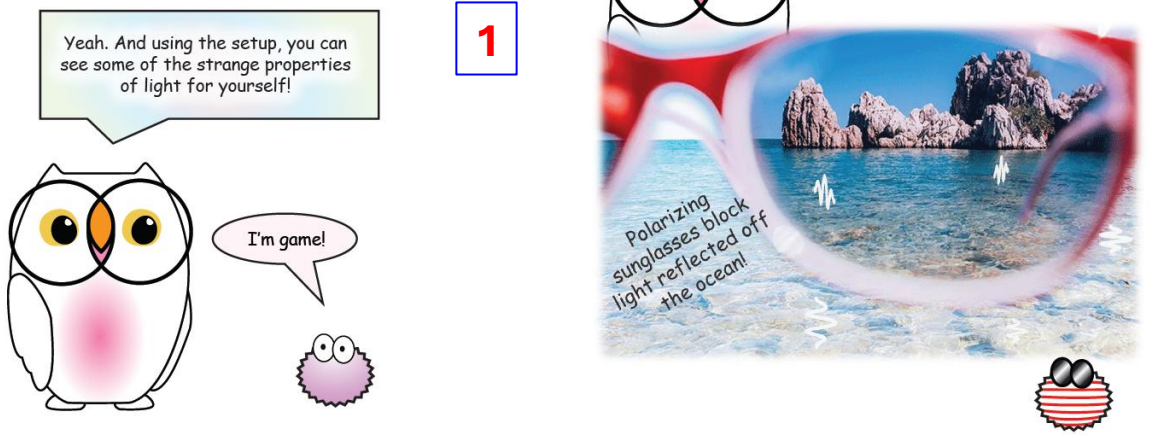
There are entangled photons traveling from a lab at the University of Illinois Urbana-Champaign over to this library!



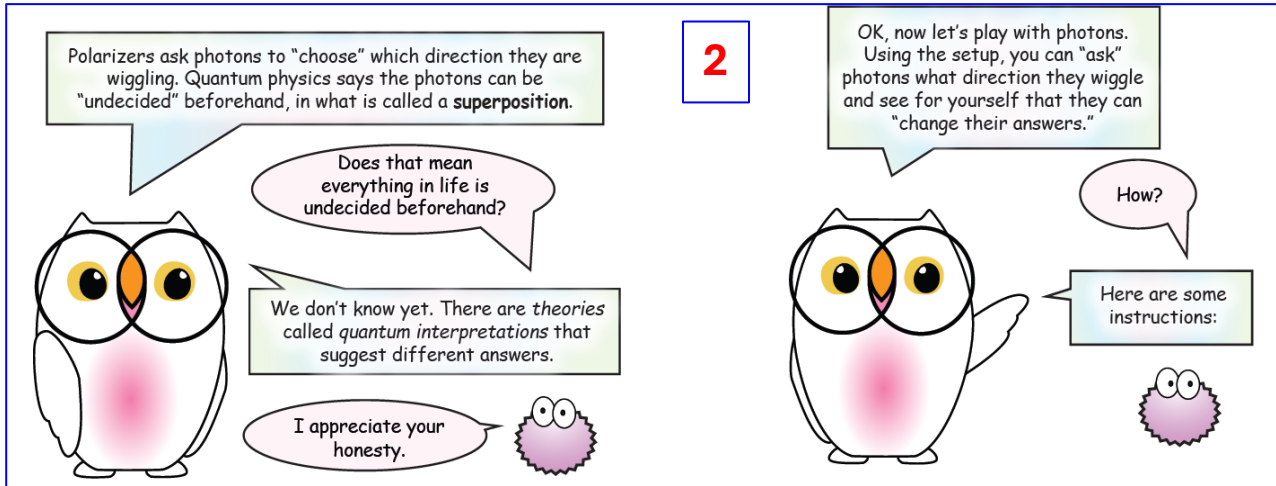
No way!

Optical fiber -- same type of fiber as carries the internet

1



2



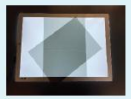
3

1. This is a polarizer.

It only lets light through that wiggles a certain direction, like Horizontal or Vertical.

2. Place one polarizer on top of the light screen.

3. Then place a 2nd polarizer on top of the first one.

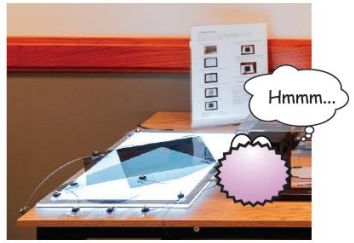


4. Rotate the 2nd polarizer only. Notice the light where they overlap changing brightness. Rotate to completely block the light.

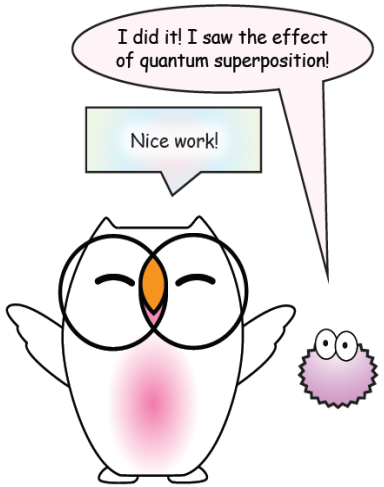
5. Place a 3rd polarizer on top of the second one and rotate it to be diagonal.

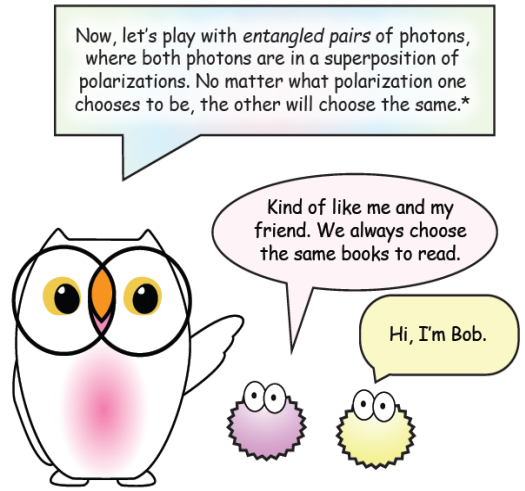
6. Now instead move the 3rd polarizer to insert it ***in between*** the 1st & 2nd polarizers, keeping it diagonal.

7. Do you see the difference in brightness between steps 5 and 6? The photons ***changed***. At the middle polarizer, some became Diagonal, which is a superposition of Horizontal and Vertical!



4





*Other types of entangled photons can choose opposites or other correlated combinations.

Hands-on Exhibit / Demonstration at the Urbana Public Library

NEWPORT BEACH PUBLIC LIBRARY

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University of California, Irvine

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We can set this up here !!

UCI Beall Applied Innovation

Optical fiber -- same type of fiber as carries the internet

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Interdisciplinary Science and Engineering Building (ISEB)

Or we can set this up here !!

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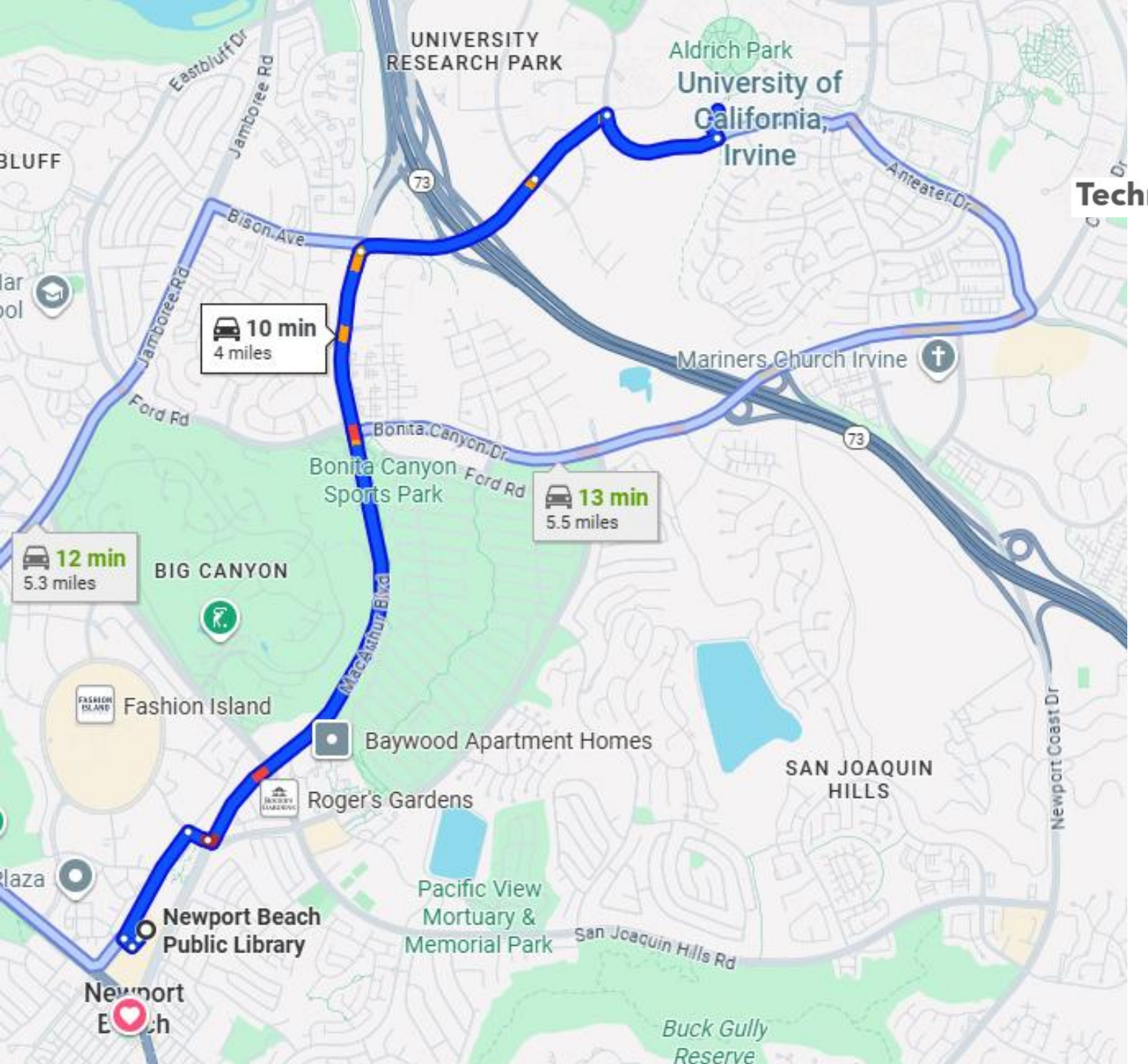

People already knowledgeable about this:

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Technology & Dark Fiber Project Overview from UCI

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LEE
NANO-OPTICS LAB

HOWARD LEE

PROFESSOR OF PHYSICS & ASTRONOMY

Lee Nano-Optics Lab

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Quynh Dang

Email: q.t.dang@uci.edu

Quynh is an currently a Physics Ph.D. student at UC Irvine. She came from a small town in northern Vietnam and obtained her B.S. in Physics from UC Santa Barbara. At UCSB, she was a research assistant at the Moody Quantum Photonics Lab working on single photon quantum light source.

Lee Nano-Optics Lab - Quynh Dang

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Donn Silberman

Quantum Optics Institute of Southern California

Donn' Bio | QOISC

Donn M. Silberman is an **SPIE Fellow**, **Optica Senior Member Emeritus** and Current & Past President & Fellow of the Optical Society of Southern California. He has provided technical engineering, management, and education to many precision optics and optical instrument companies and educational entities in Southern California for over 40 years. Since retiring in Feb. 2021, he has been focusing on quantum science education for people of all ages.

Donn has been a member of The Quantum Economic Development Consortium, (QED-C) Workforce Development (WfD) Technical Advisory Committee (TAC) for several years.

In 2009, he founded the UCI DCE **Certificate Programs** in:
Optical Engineering & Optical Instrument Design

Donn is a volunteer on the committee for:
Spotlight on Science - Newport Beach Public Library Foundation

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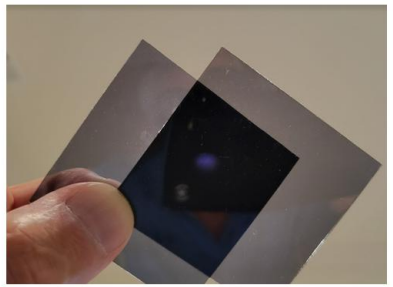
Donn Silberman
Quantum Optics Institute of Southern California

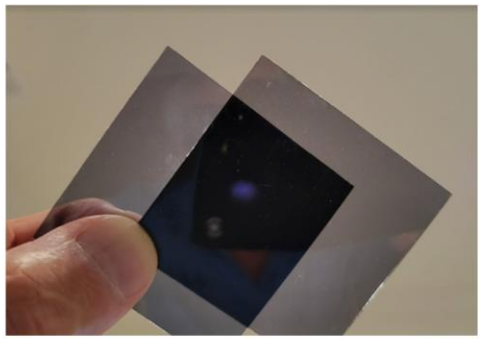
Polarization Filters – Hands-on Experiment

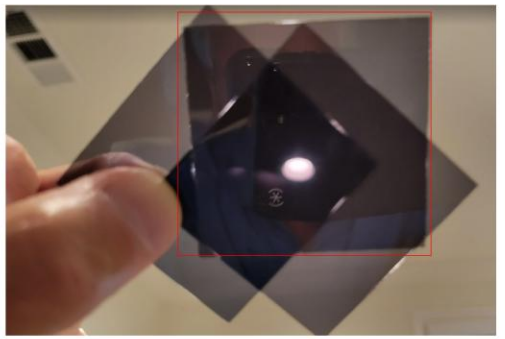

Ceiling light – no **P** filters


Ceiling light – one **P(h)** filter


Ceiling light – one **P(v)** filter


Ceiling light – both **P(h & v)** filters


Ceiling light – both **P(h & v)** filters


Ceiling light – both **P(h & v)** filters
Plus a third **P** filter at 45 deg !!!
(sandwiched in-between

Donn has been doing presentations and workshops in Orange County for many years using these Quantum Polarization hands-on demonstrations and encouraging people to learn about Quantum Education and Career Pathways.

He has also been a volunteer with **Vital Link** for over 10 years where he goes to local K-12 schools for Exhibit Days and College & Career Fairs.

You can read his published papers here:
Publications | QOISC

And see photos of his adventures with local students here:
Donn's Public Photo Albums | QOISC

Donn can bring this small demonstration to show you !!

Requesting permission to set this up at the:

Funding needed for this entire project is <$100K. Funding sources re currently TBD.

Cox Business ~ $20K (construction costs)
Set up at NBPL ~ $5K
Set up at UCI ~ $50K

Ongoing Lease of Dark Fiber from Cox ~ $2.5K / month

Ongoing technical support will be provided by QOISC + UCI.

Questions?