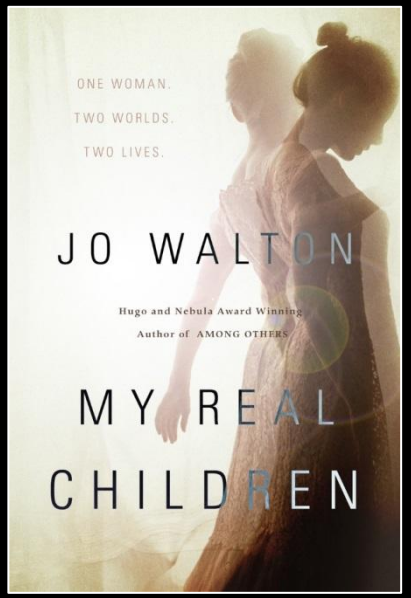
Many Worlds, Many Stories

The Everett Interpretation in science fact and science fiction

Chad Orzel

UNION
COLLEGE
FOUNDED 1795



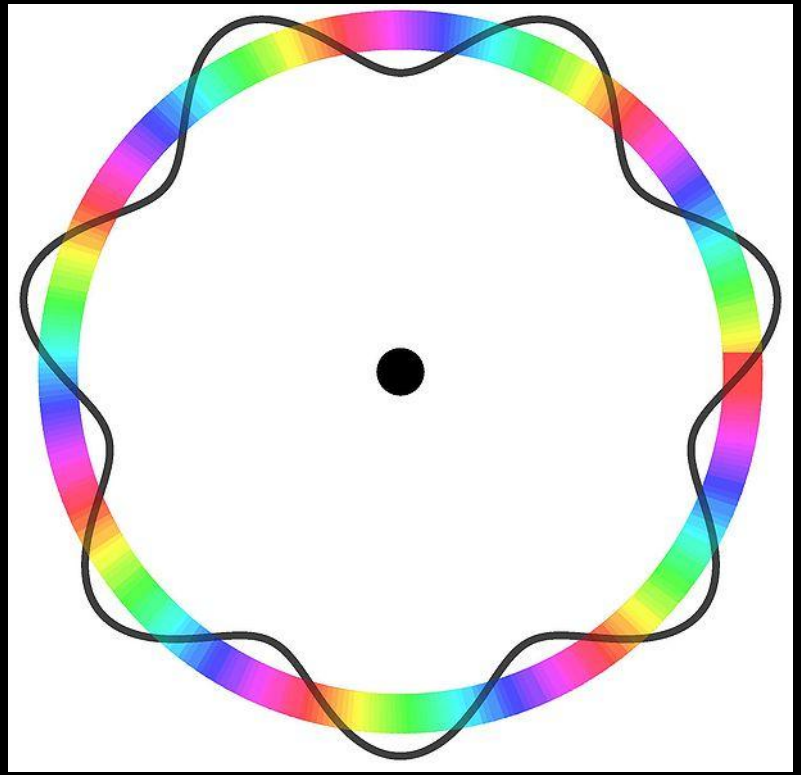


Image: Pieter Kuiper

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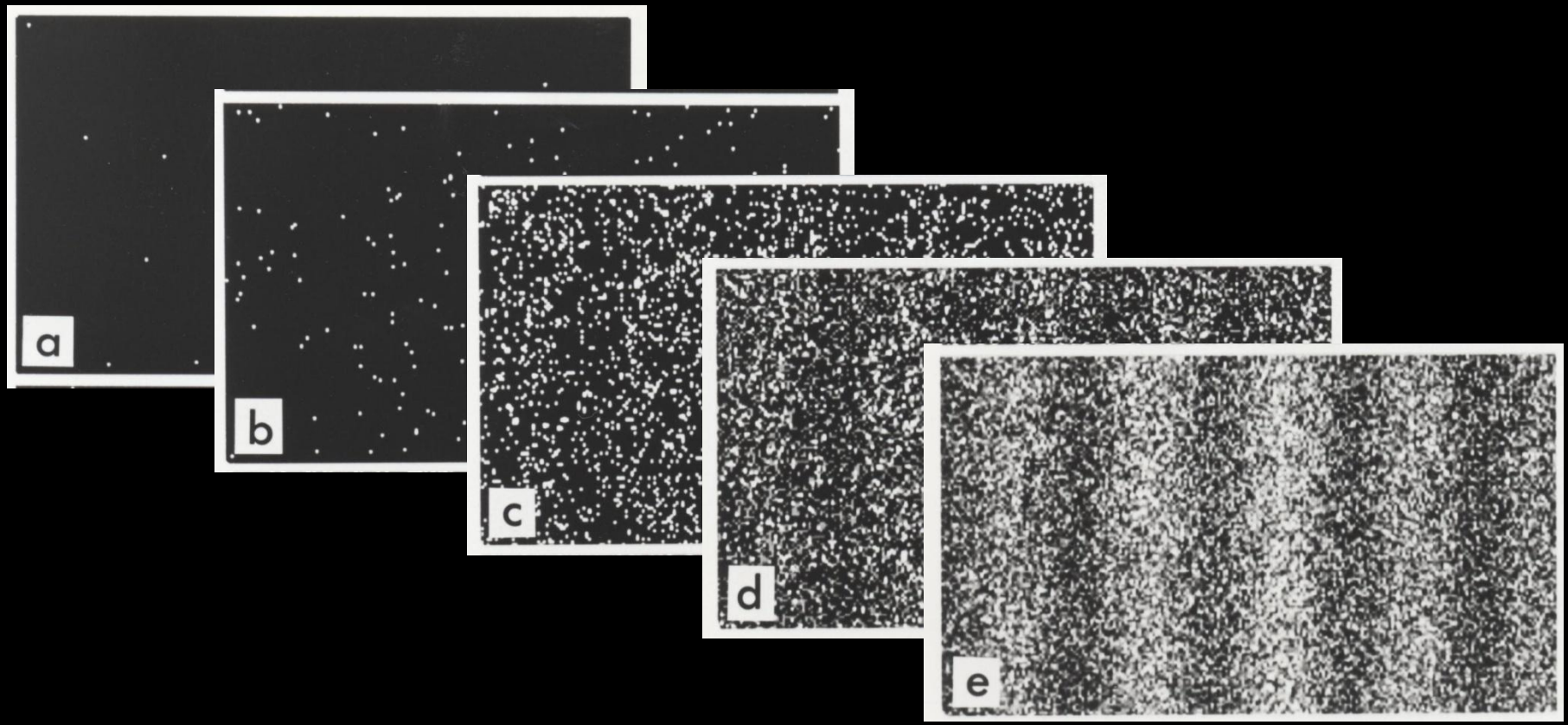

http://commons.wikimedia.org/wiki/File:Double-slit_experiment_results_Tanamura_2.jpg

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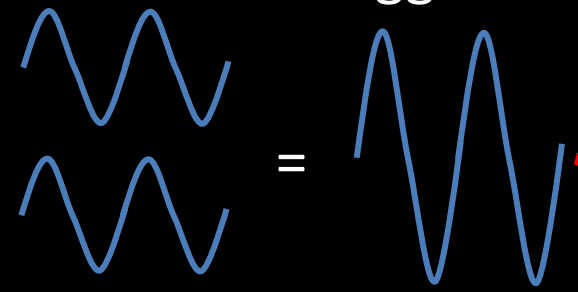
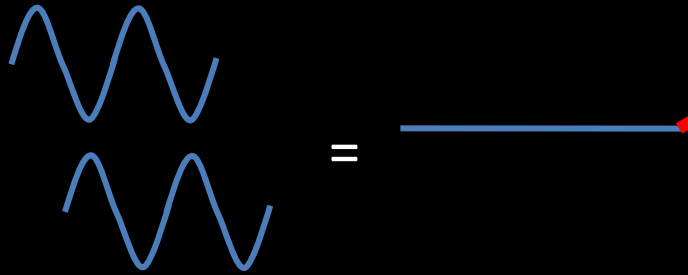
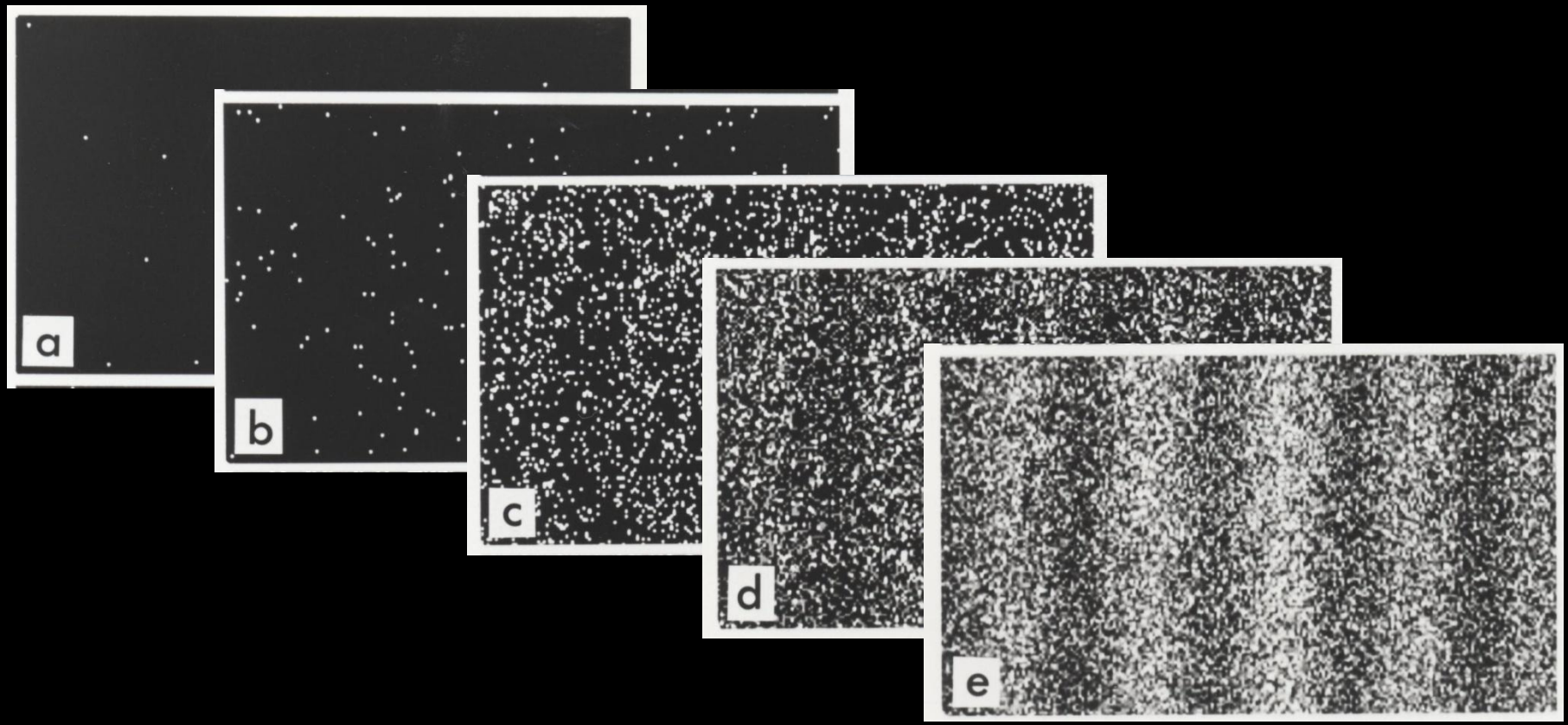
Peak + Peak Bigger Peak



Peak + Valley Nothing



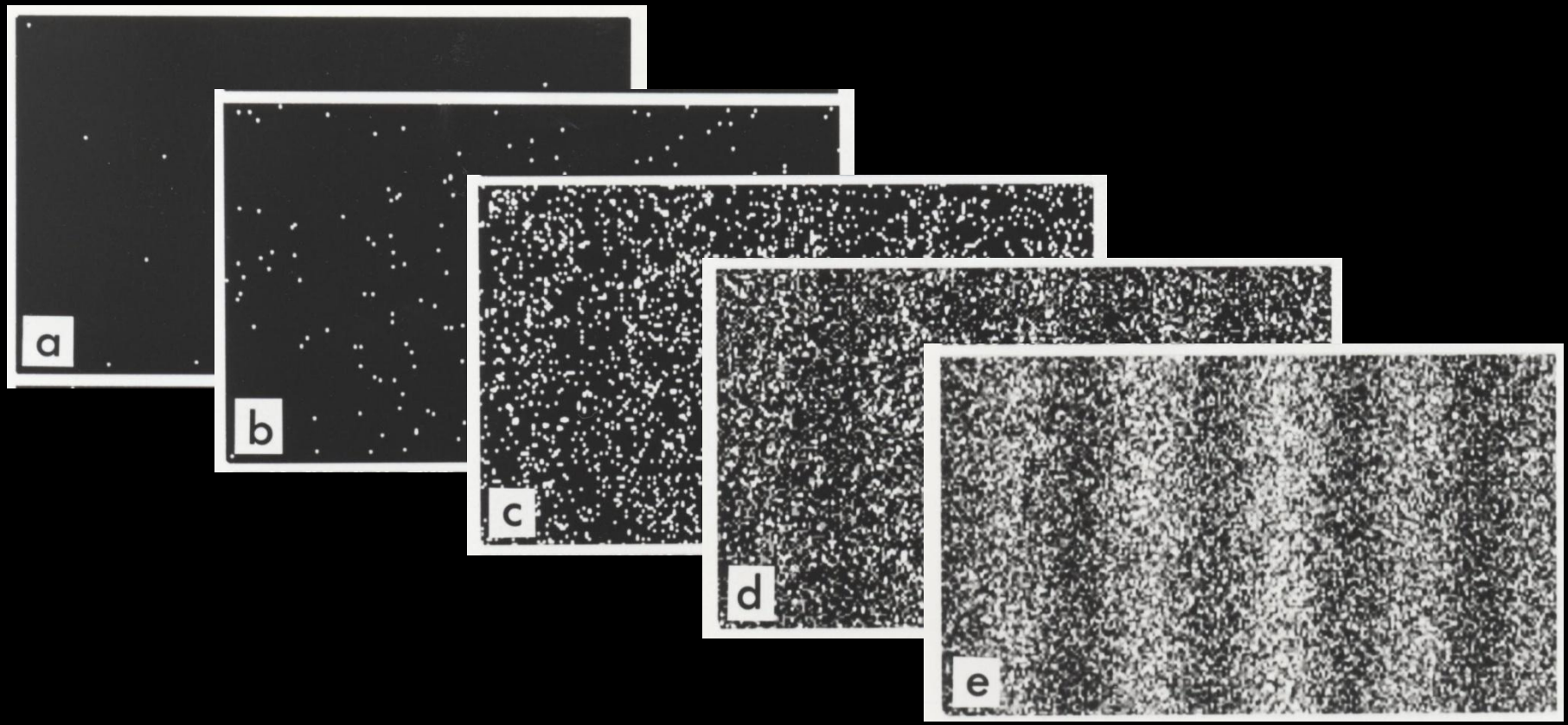


http://commons.wikimedia.org/wiki/File:Double-slit_experiment_results_Tanamura_2.jpg

$$i\hbar\frac{\partial}{\partial t}\Psi(\vec{r},t) = -\frac{\hbar^2}{2m}\nabla^2\Psi(\vec{r},t) + V(\vec{r},t)\Psi(\vec{r},t)$$

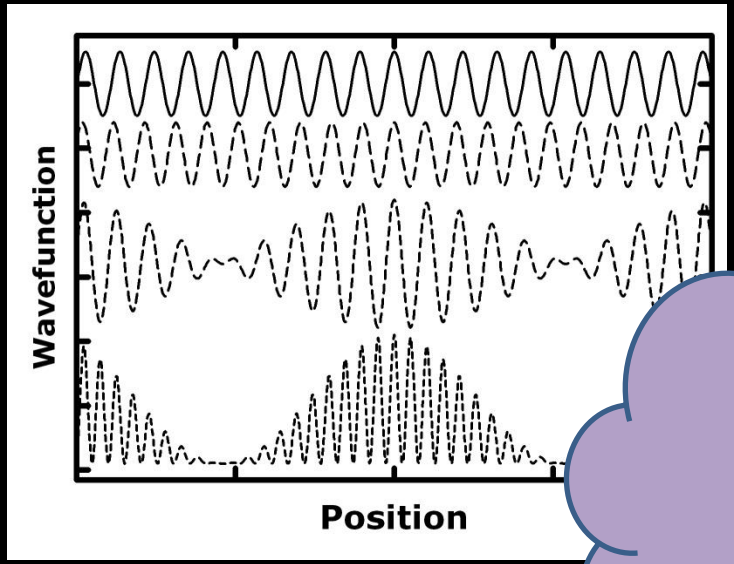
https://photos.aip.org/history-programs/niels-bohr-library/photos/schrodinger-erwin-b9

https://commons.wikimedia.org/wiki/File:Max_Born.jpg

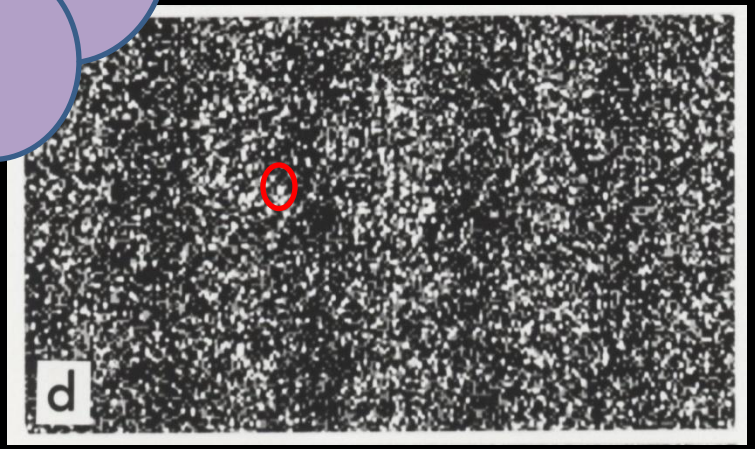


http://commons.wikimedia.org/wiki/File:Double-slit_experiment_results_Tanamura_2.jpg

How to teach Quantum Physics to your dog
Chad Orzel
Townsend
A Modern Approach to Quantum Mechanics
University Science Books
Merzbacher
Quantum Mechanics
Second Edition
Wiley


Wavefunction
Position

???


d

Quantum Shorts

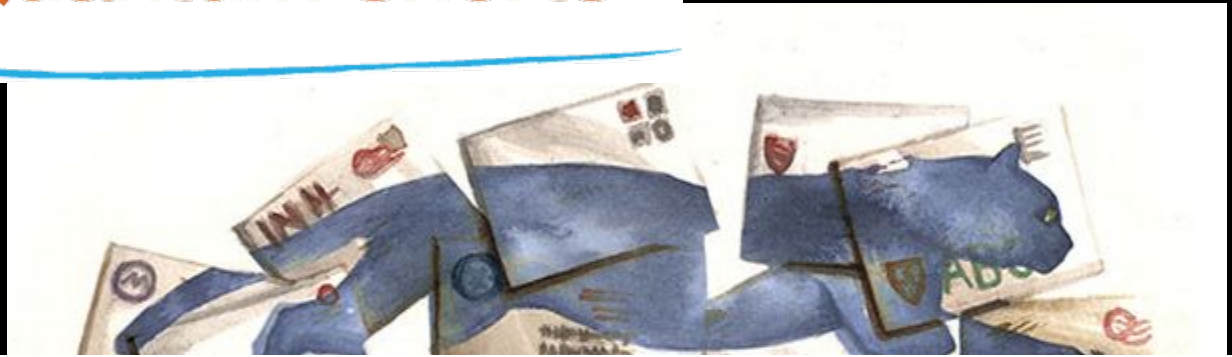
The Qubits of College Acceptance

by Lily Turaski

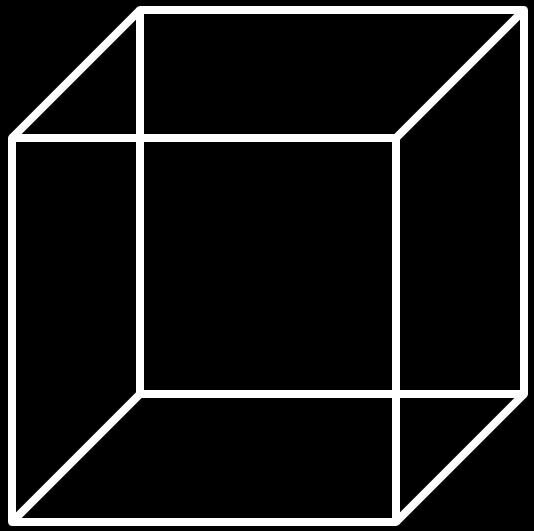
2015 WINNER: People's Choice Prize and Runner Up, Youth Category

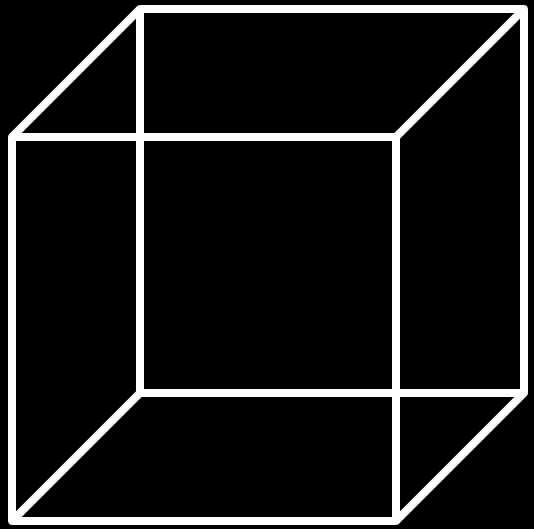
https://shorts.quantumlah.org/entry/qubits-college-acceptance/

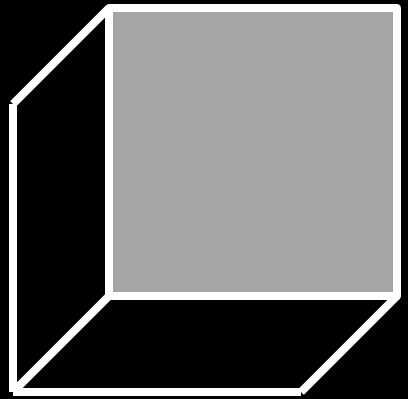
Quantum Shorts

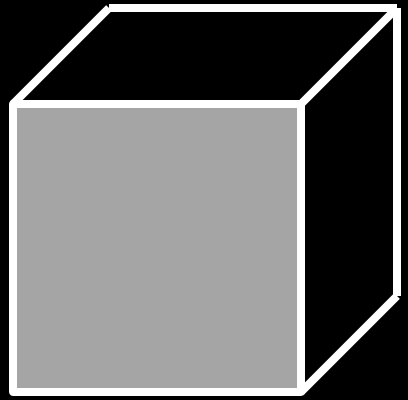


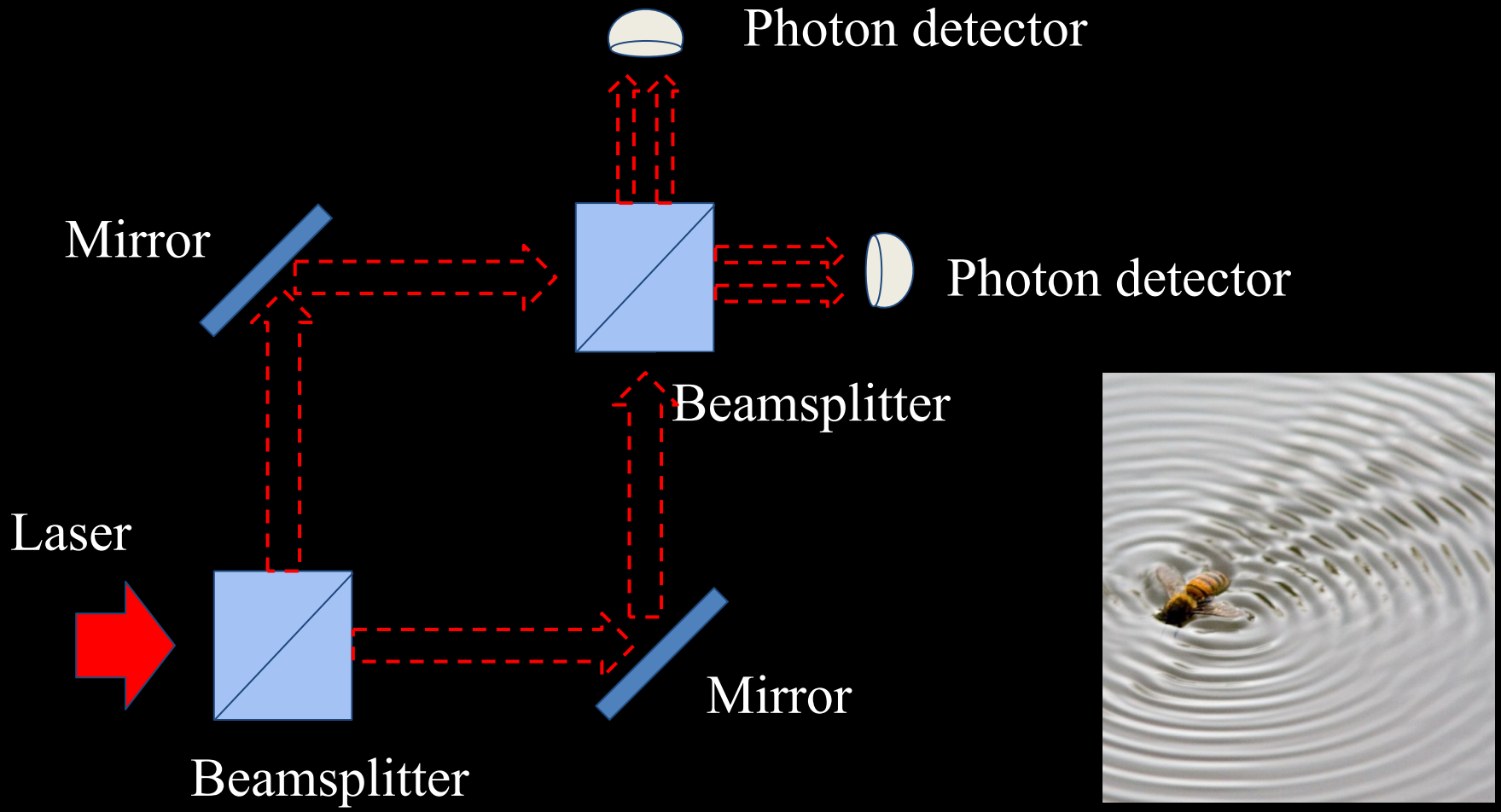
“There is comfort in knowing that I have the power to change the course of my life. It is not the envelopes that decide my fate; it is my choice to observe the envelopes that decides my fate. I have won the battle against the envelopes. I have been accepted into all eight Ivy League schools. Of course, I have also been denied by all eight Ivy League schools, but again I focus on the yes.”

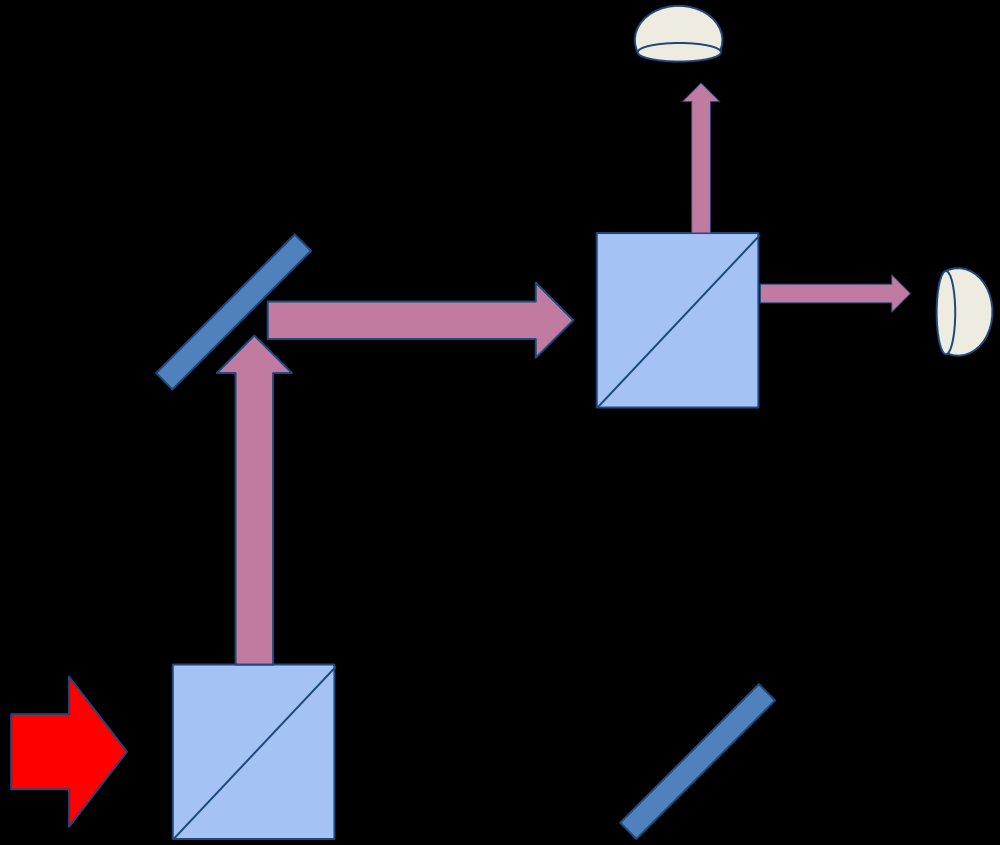


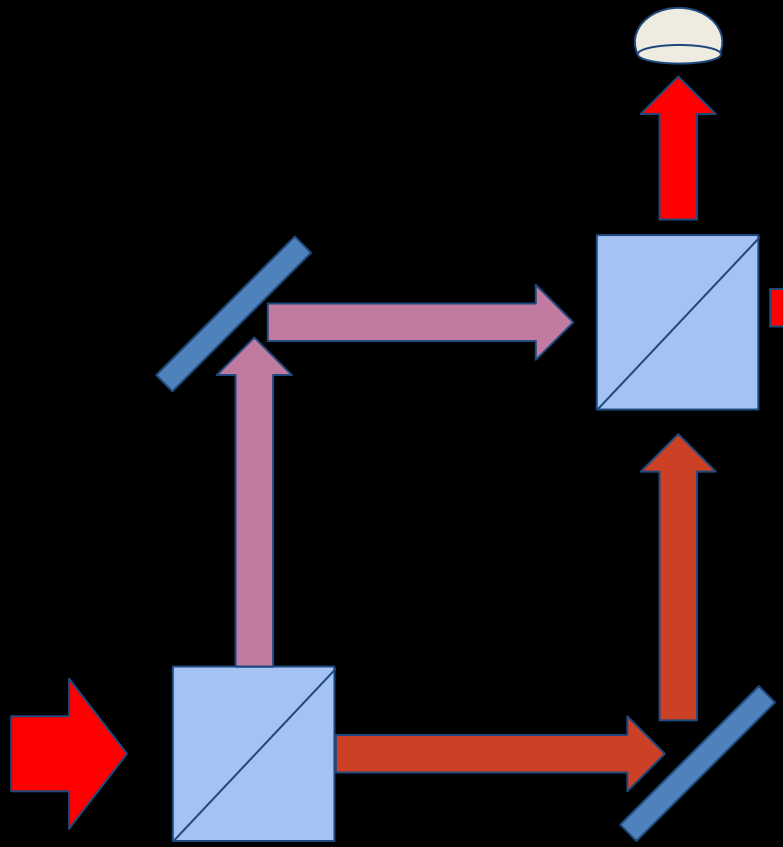




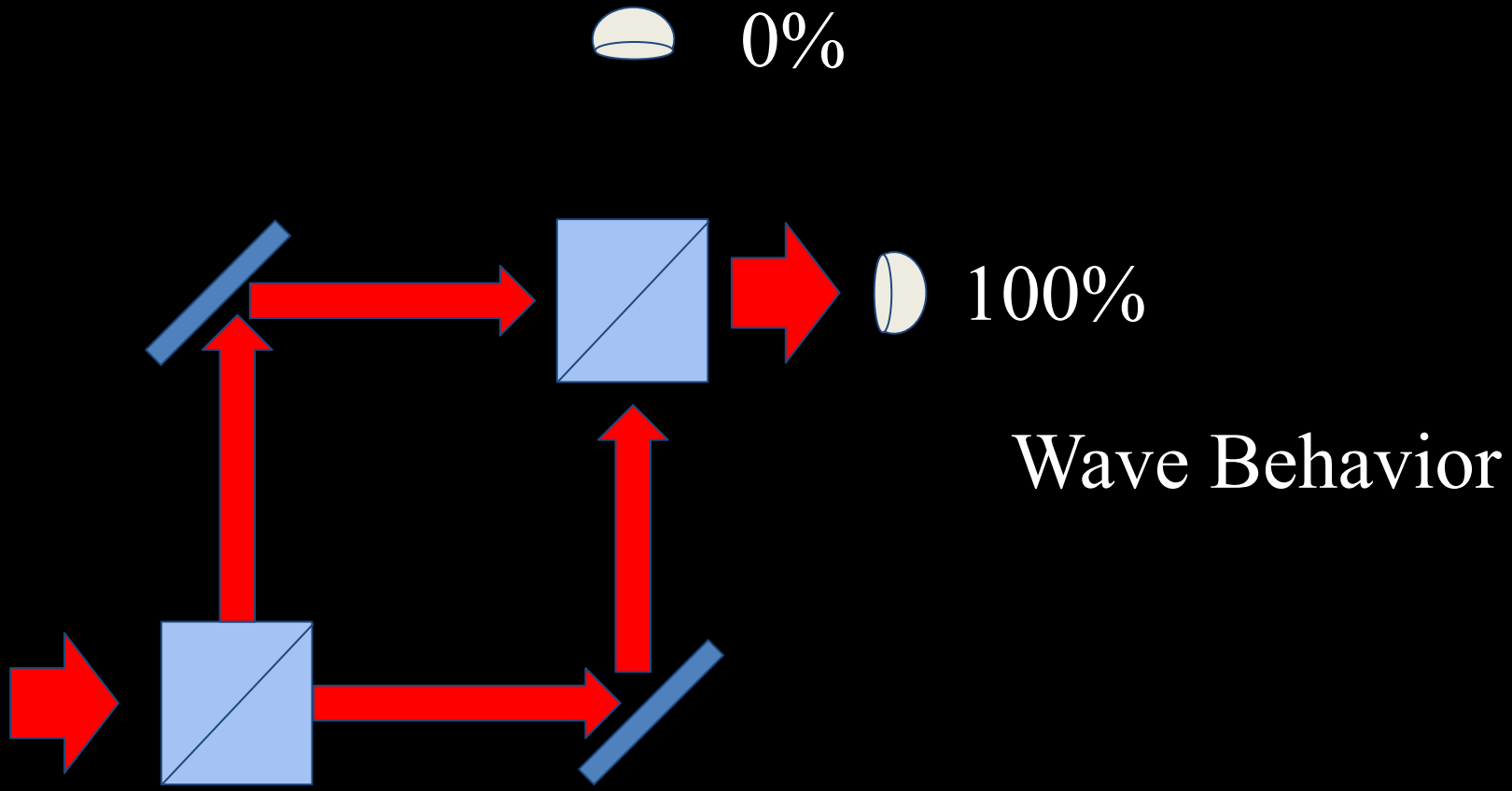



Photon detector
Mirror
Photon detector
Beamsplitter
Laser
Mirror
Beamsplitter





Particle Behavior


0%
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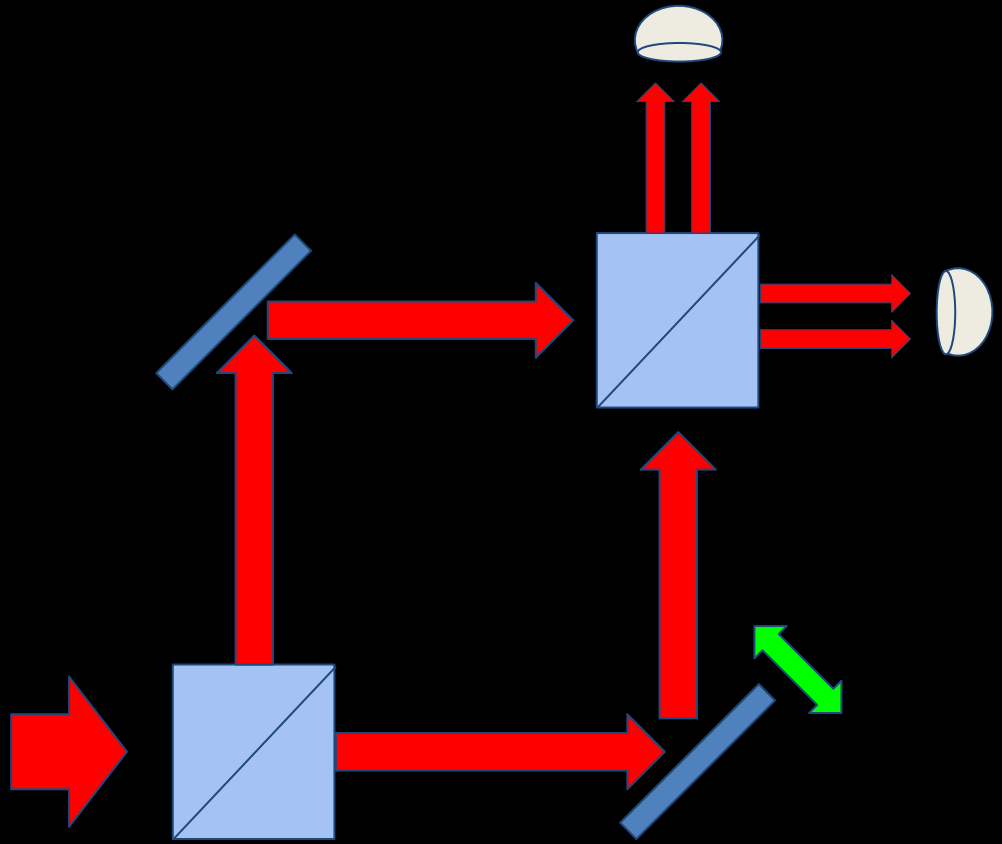
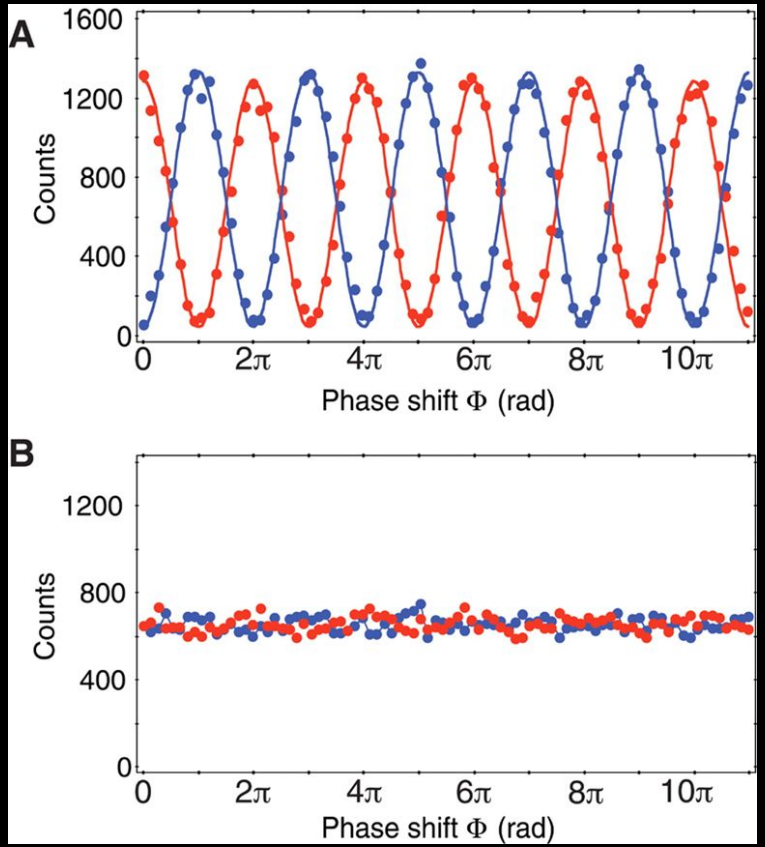
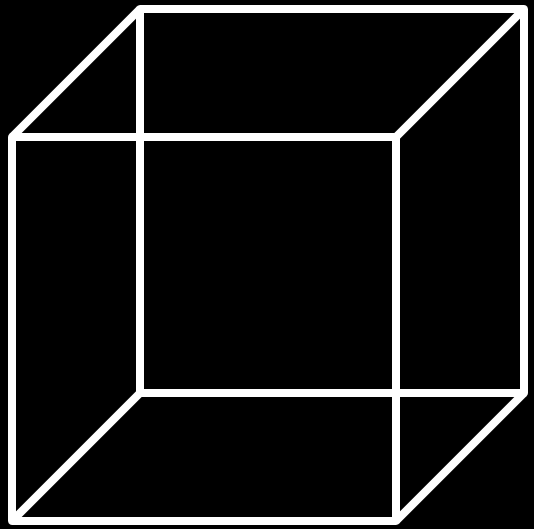
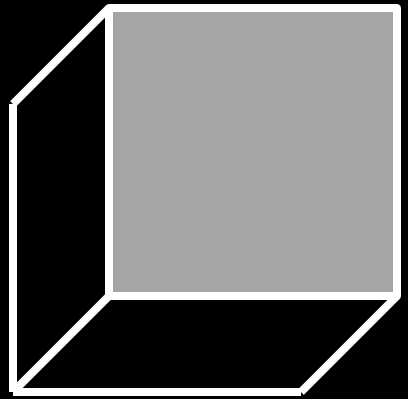
Wave Behavior

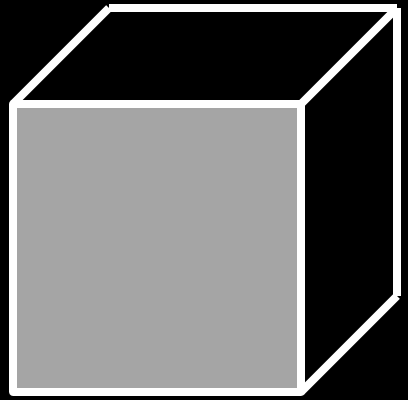


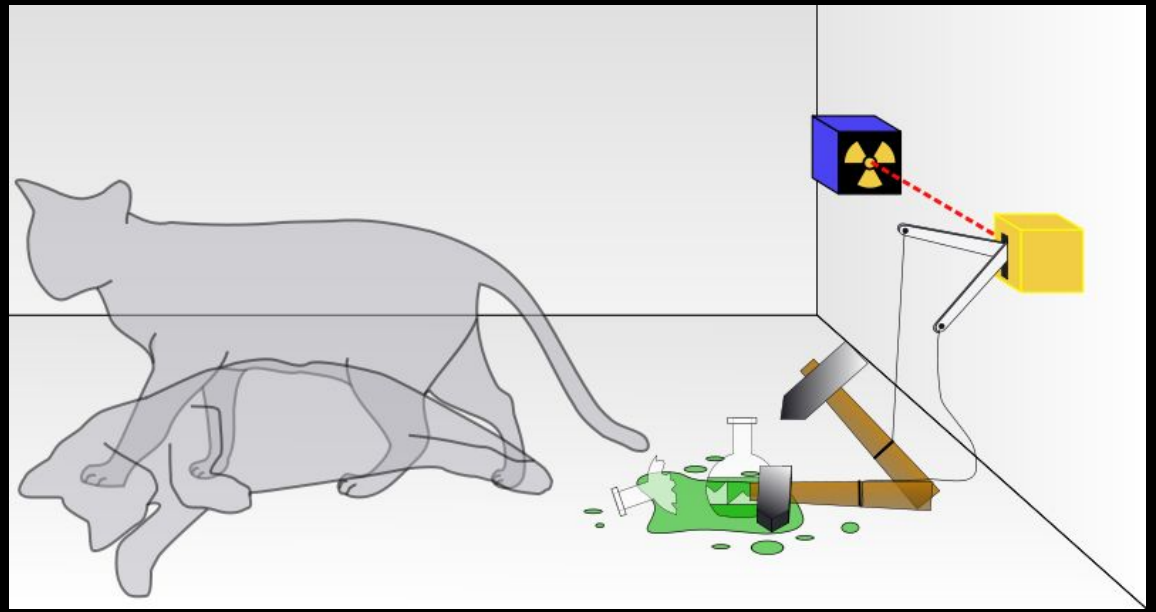


https://doi.org/10.1126/science.1136303







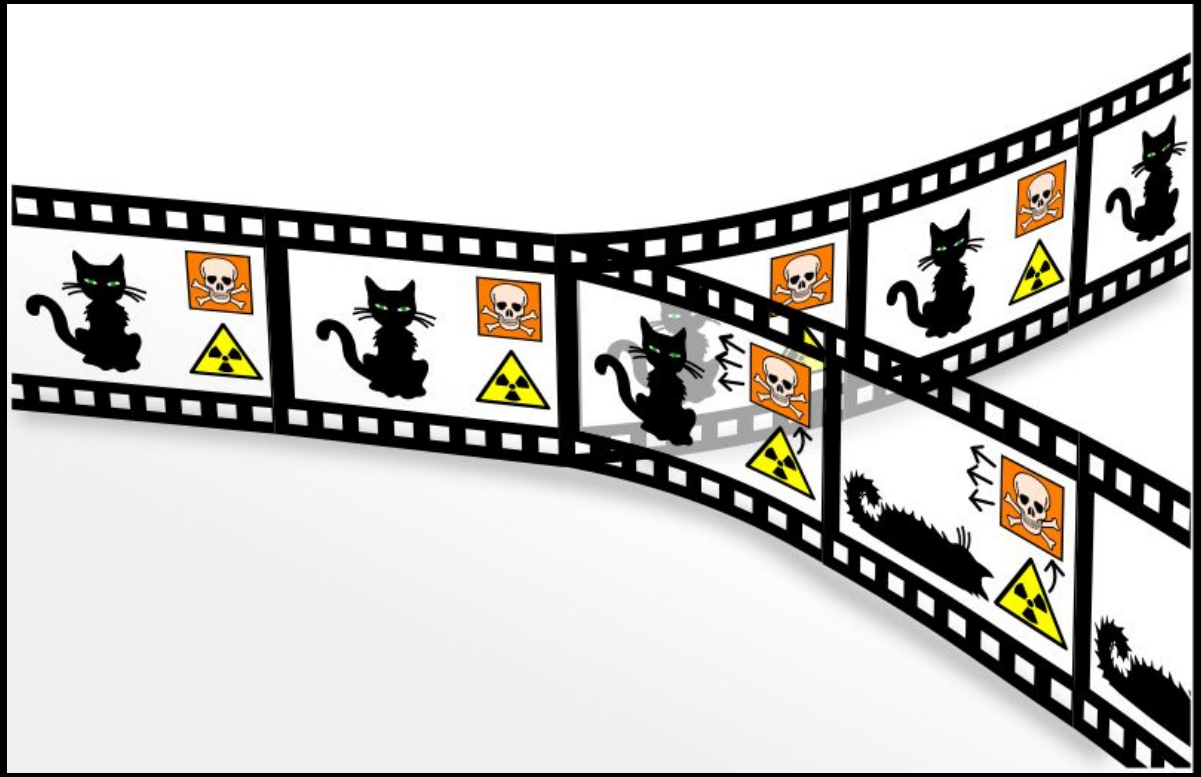


https://commons.wikimedia.org/wiki/File:Schrodingers_cat.svg

https://photos.aip.org/history-programs/niels-bohr-library/photos/schrodinger-erwin-b9

MANY-WORLDS

Hugh Everett III



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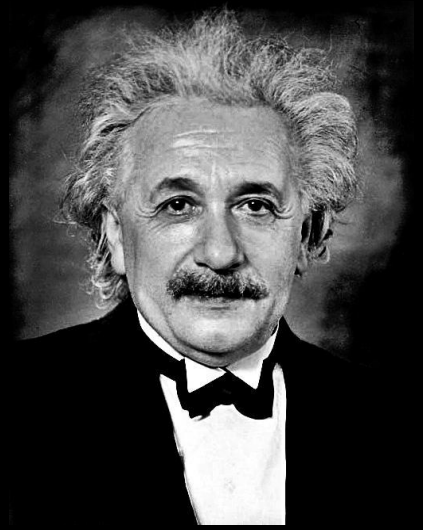
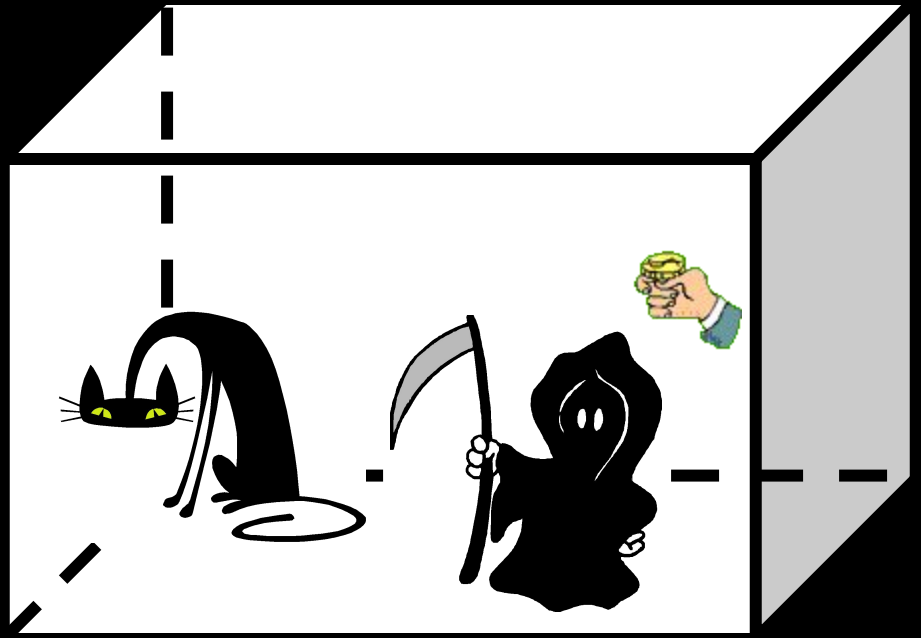
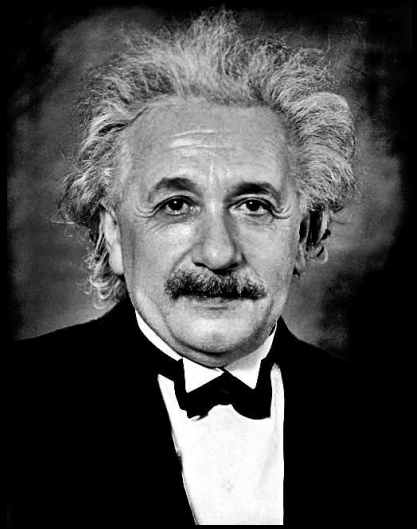
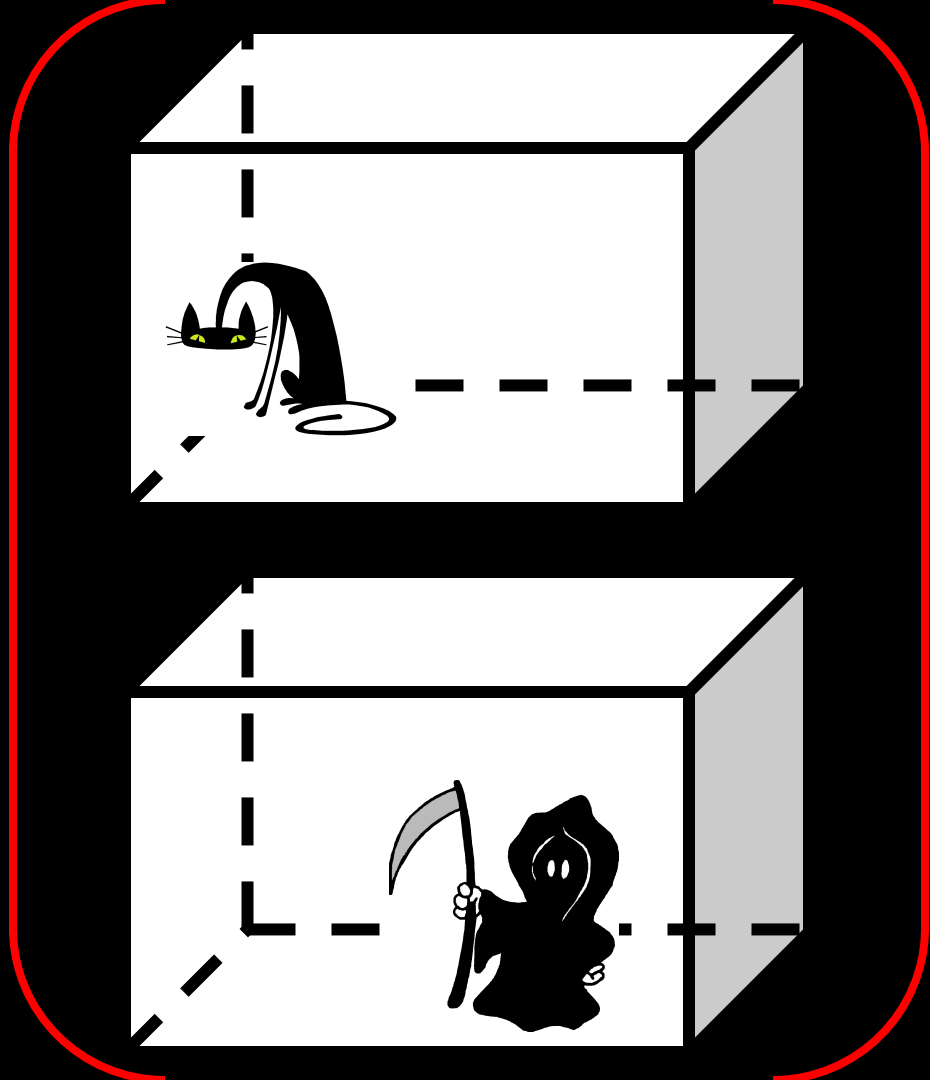
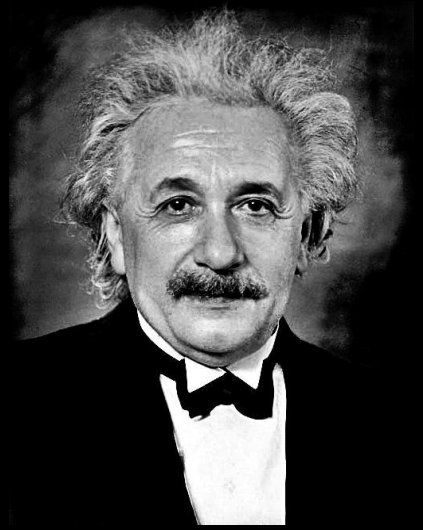
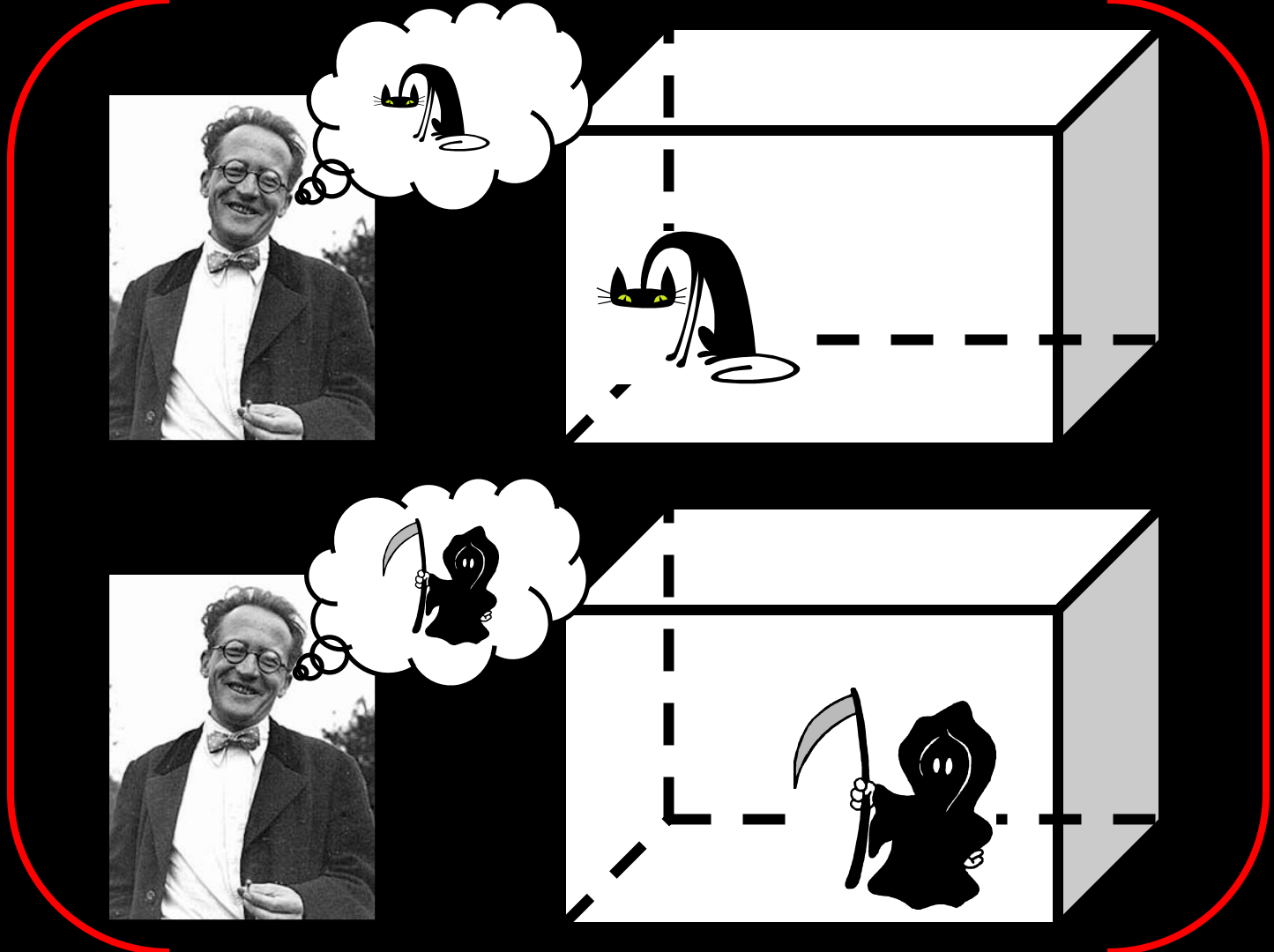


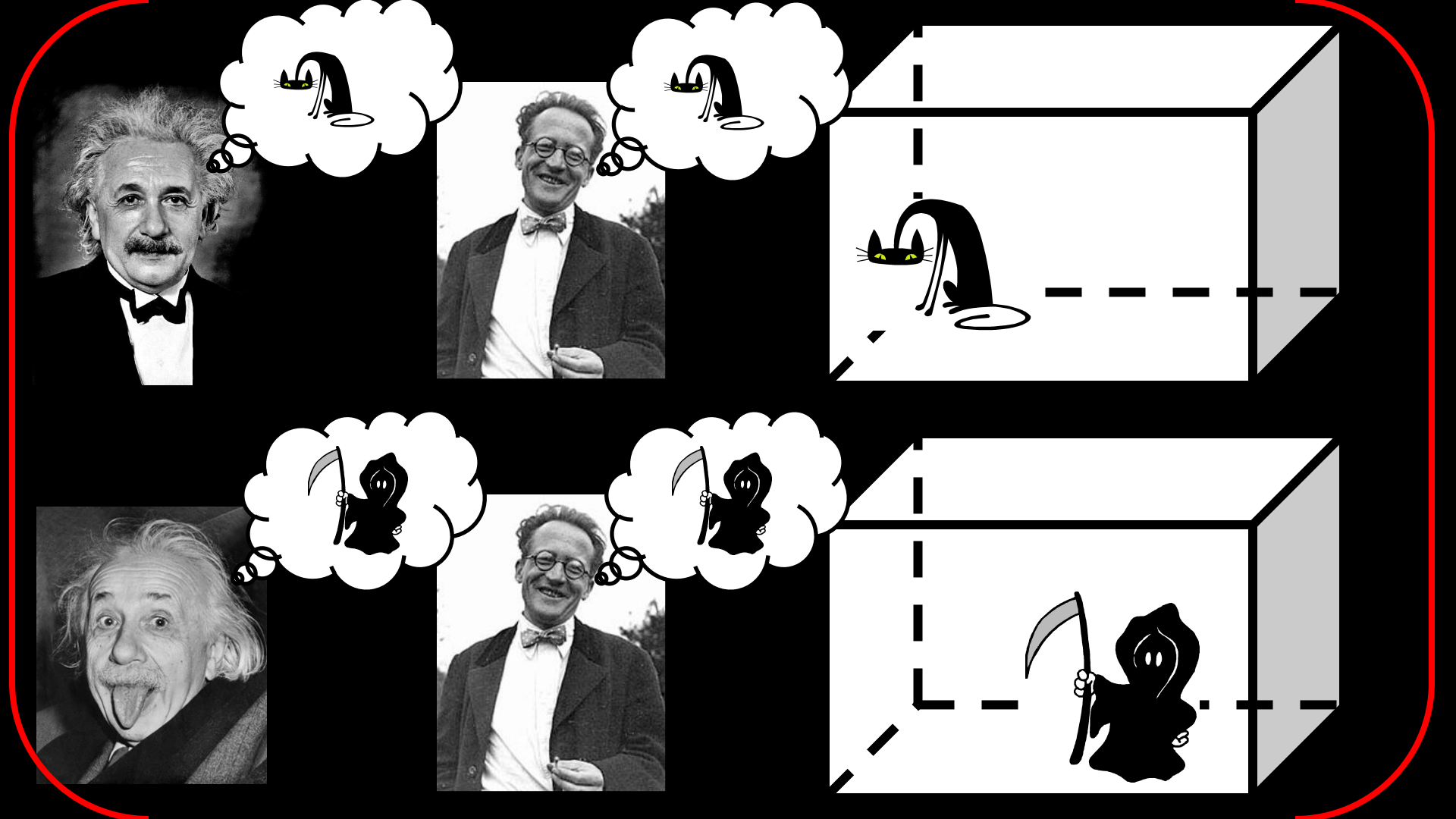


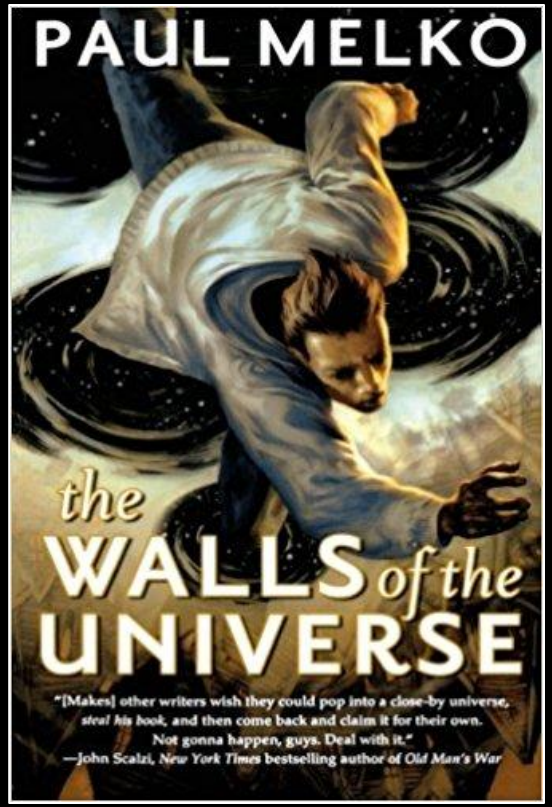


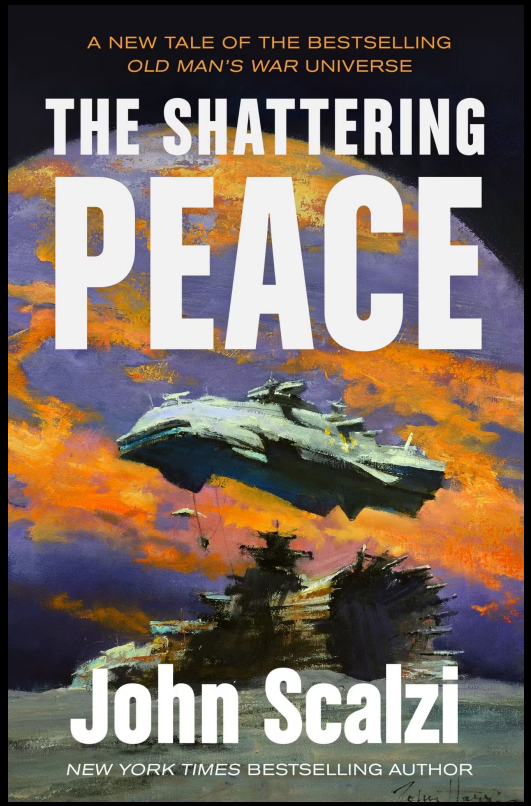


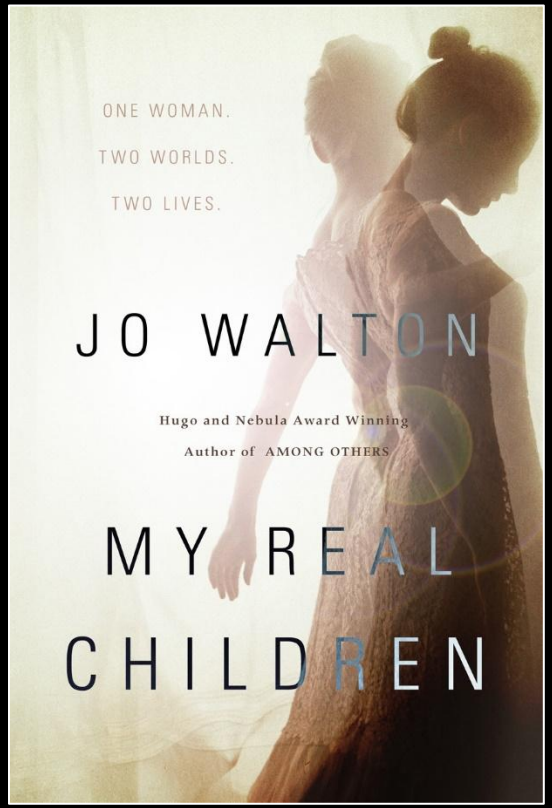







PAUL MELKO
the WALLS of the UNIVERSE
"[Makes] other writers wish they could pop into a close-by universe, steal his book, and then come back and claim it for their own. Not gonna happen, guys. Deal with it."
—John Scalzi, New York Times bestselling author of Old Man's War


A NEW TALE OF THE BESTSELLING OLD MAN'S WAR UNIVERSE
THE SHATTERING PEACE
John Scalzi
NEW YORK TIMES BESTSELLING AUTHOR


ONE WOMAN.
TWO WORLDS.
TWO LIVES.
JO WALTON
Hugo and Nebula Award Winning
Author of AMONG OTHERS
MY REAL CHILDREN

FRINGE
New Beginning. New Dimensions.
FRI 9/23
9/8c FOX

AN AMAZON ORIGINAL SERIES
THE MAN IN THE
HIGH CASTLE
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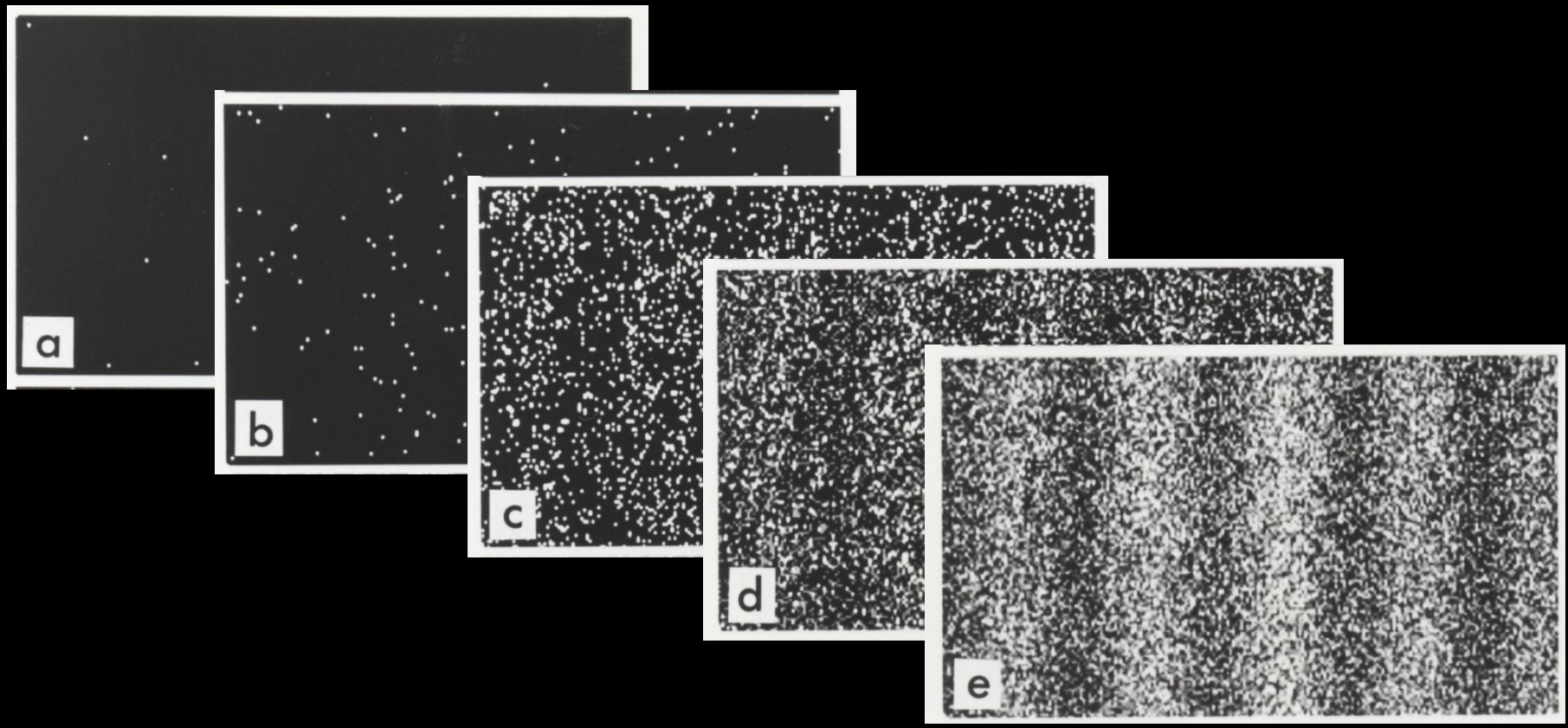
EVERYTHING
EVERYWHERE
ALL AT ONCE
天馬行空



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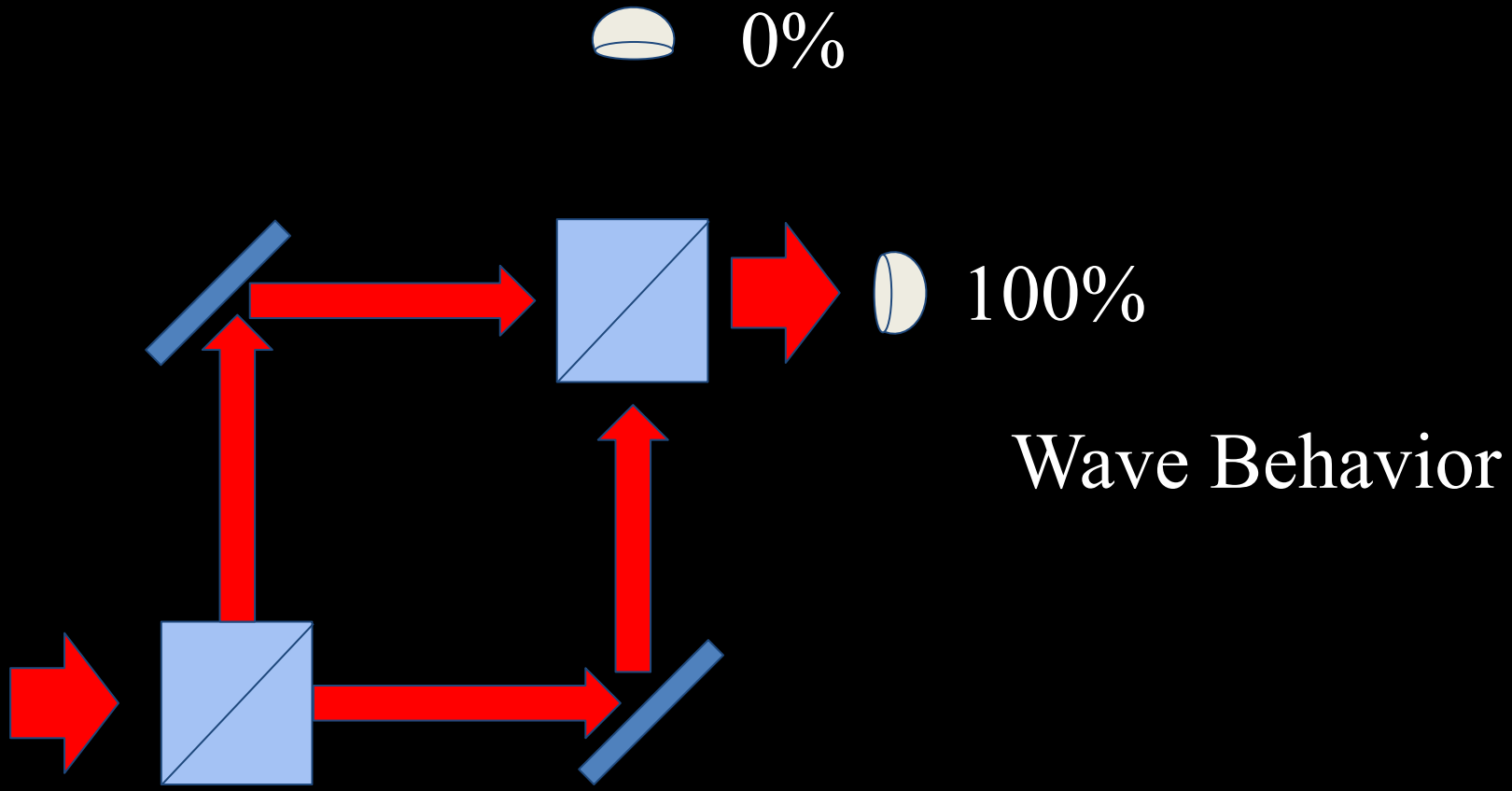
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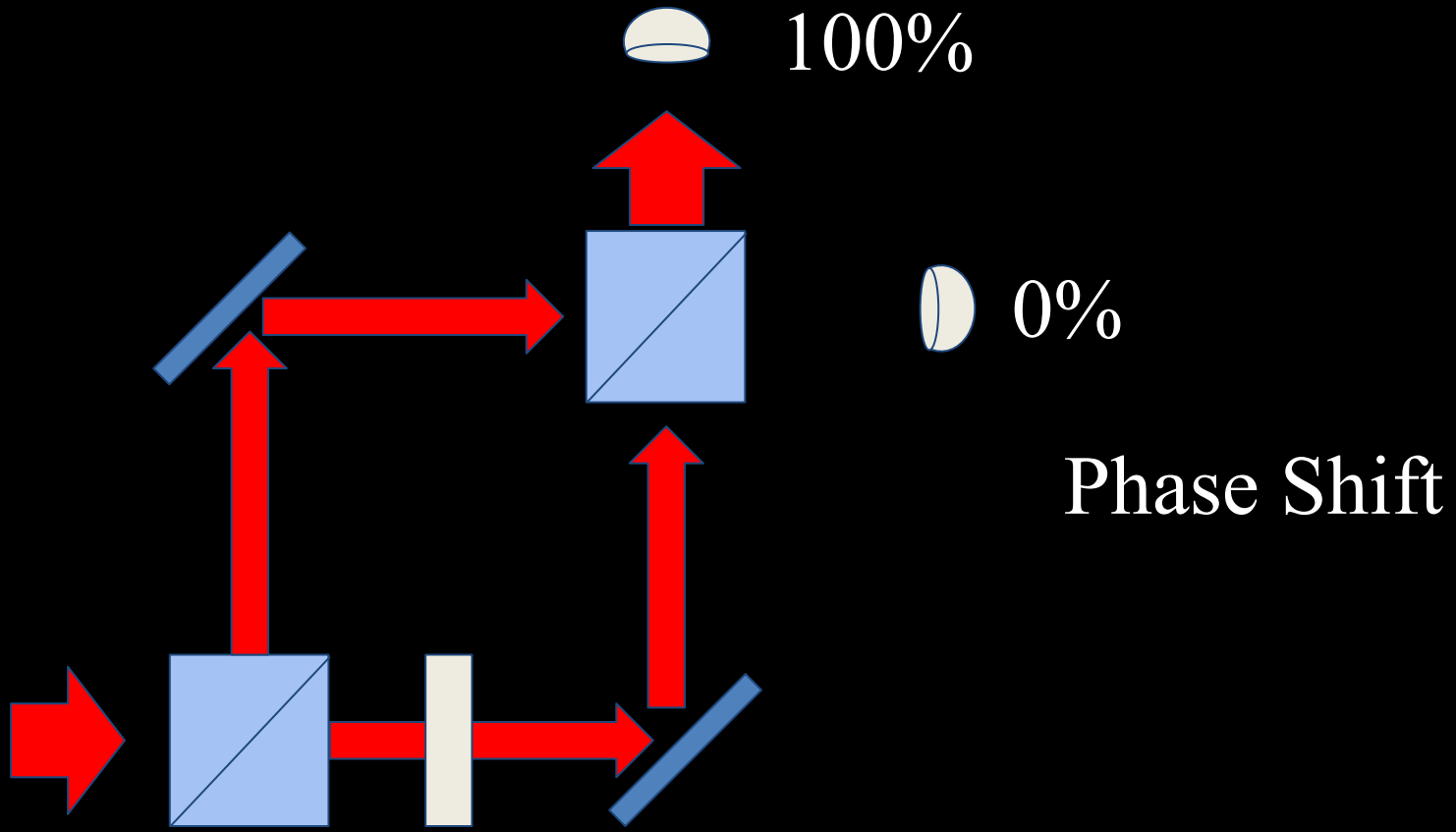
Wave Behavior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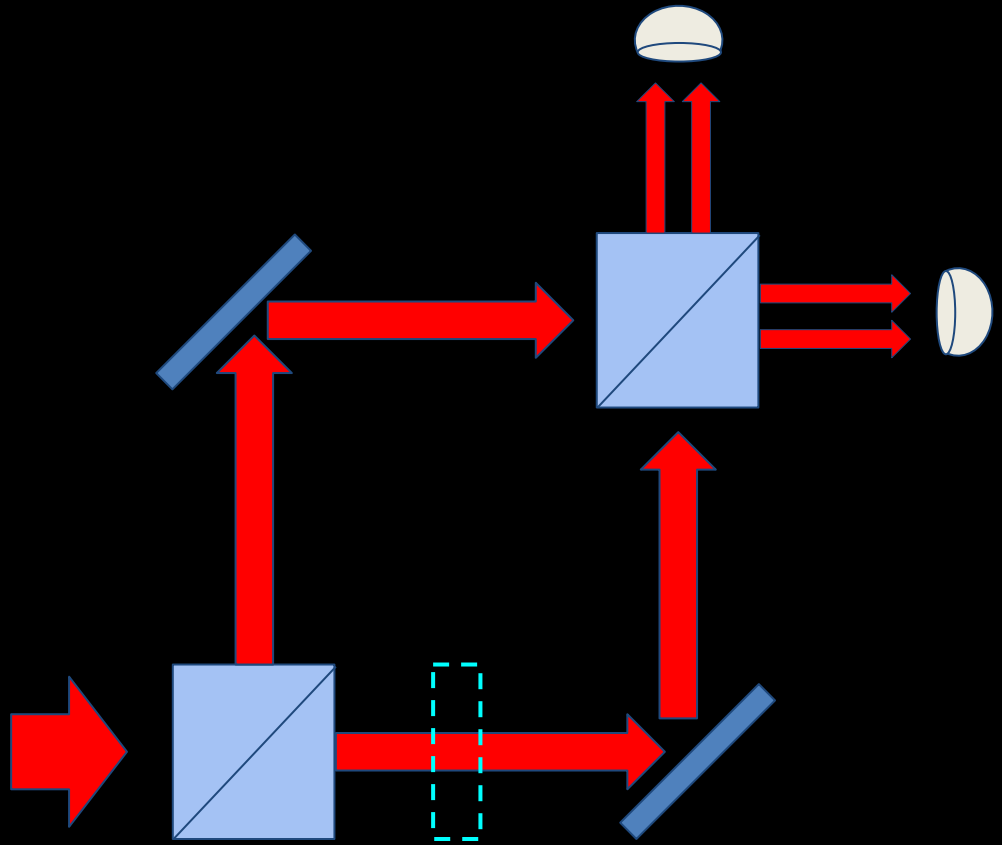
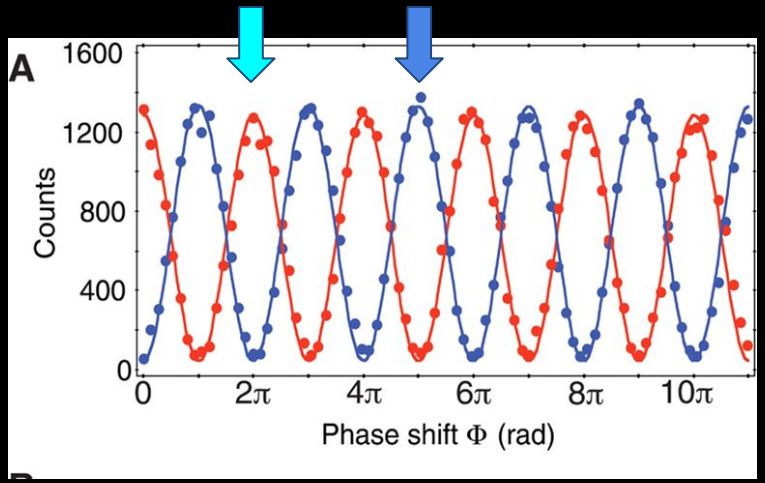
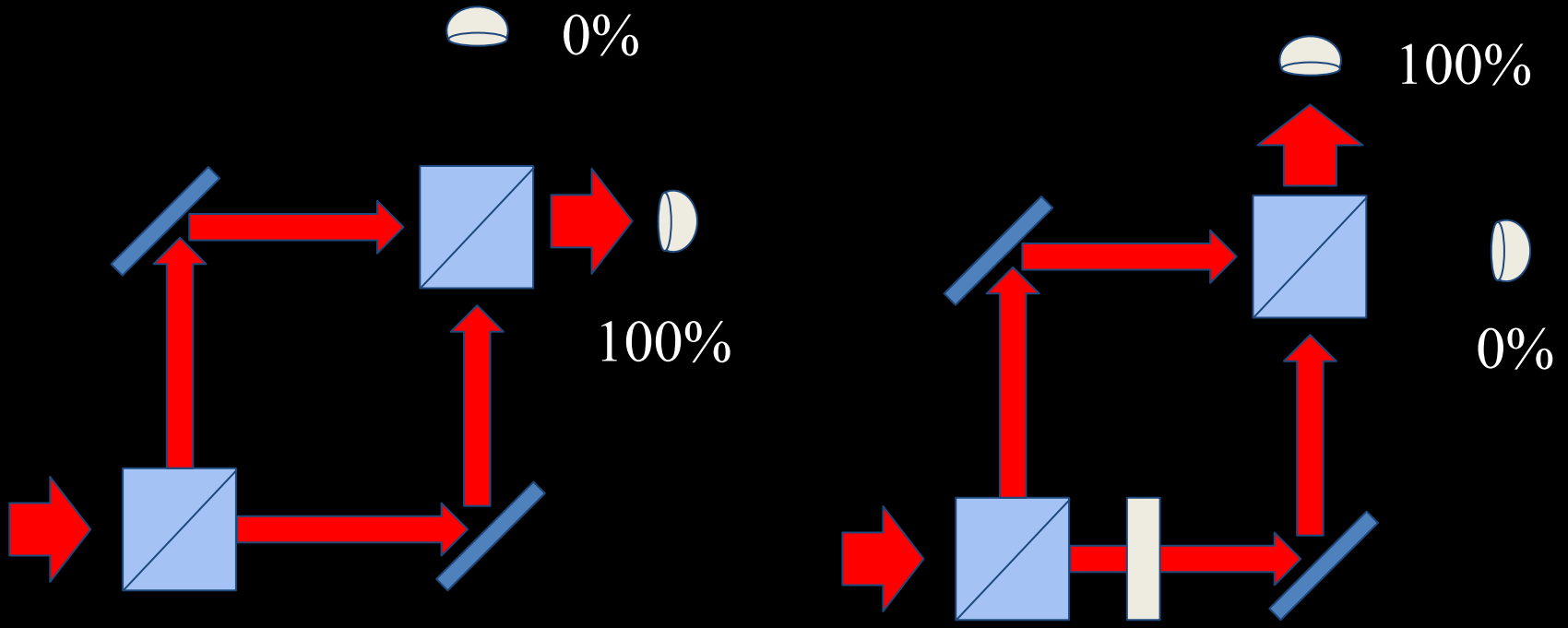
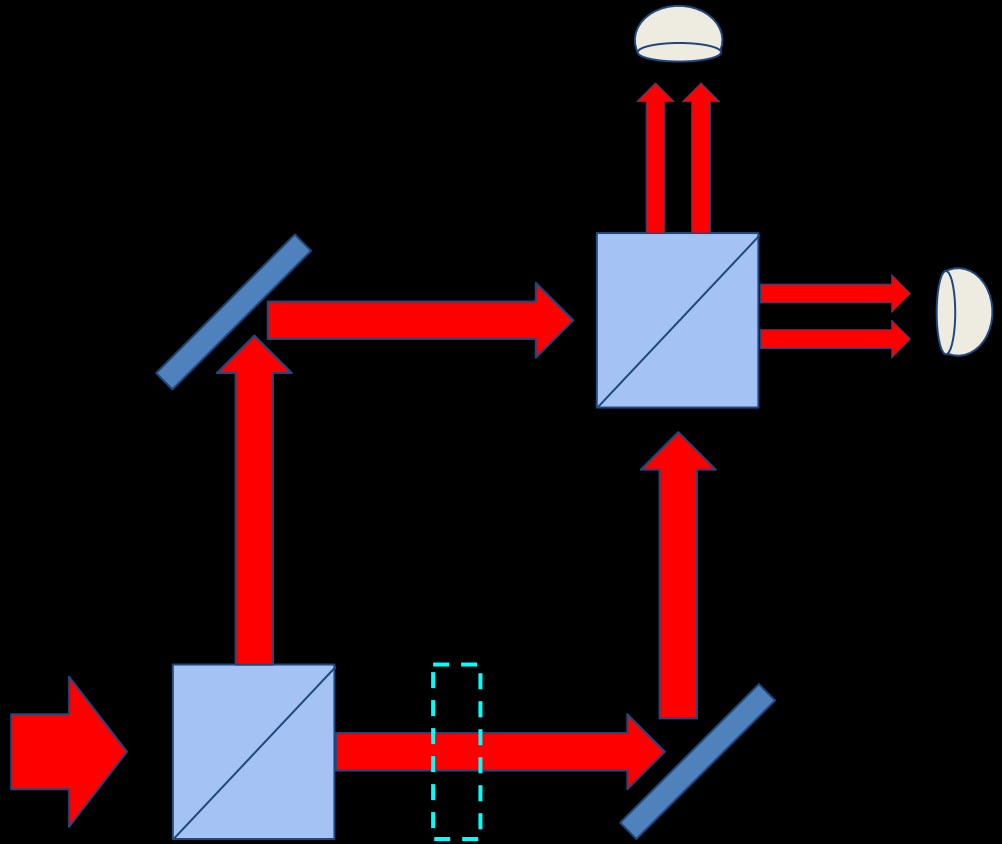
Phase Shift

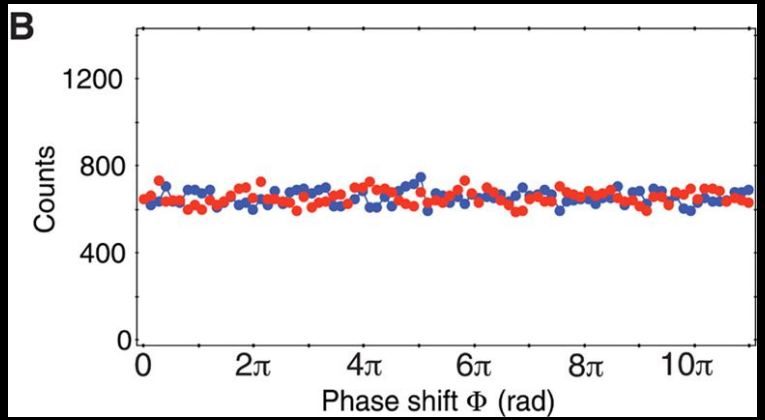



A
1600
1200
800
400
0
Counts
0
2π
4π
6π
8π
10π
Phase shift Φ (rad)



⇒ Random alternation looks like particles




B
1200
800
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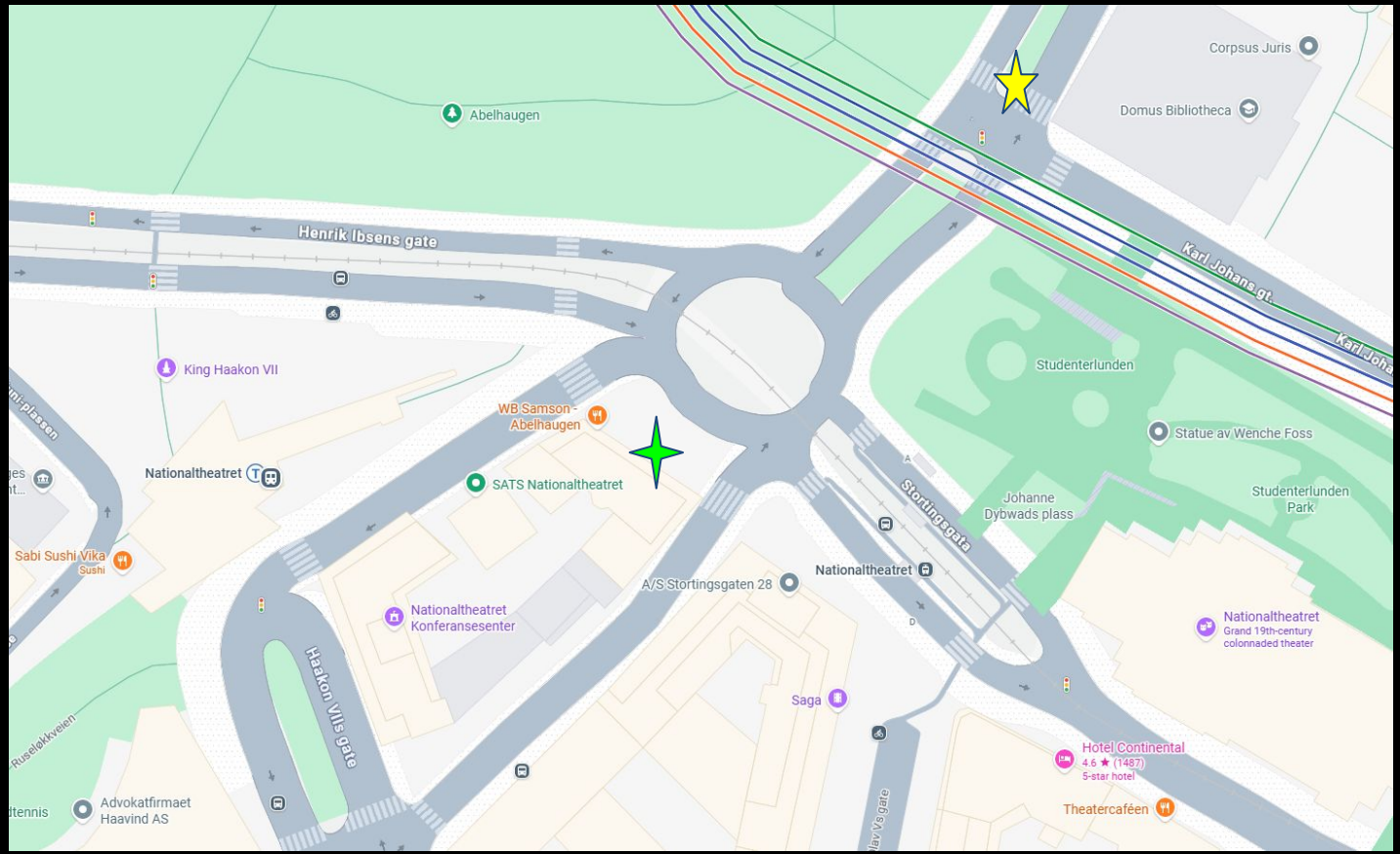
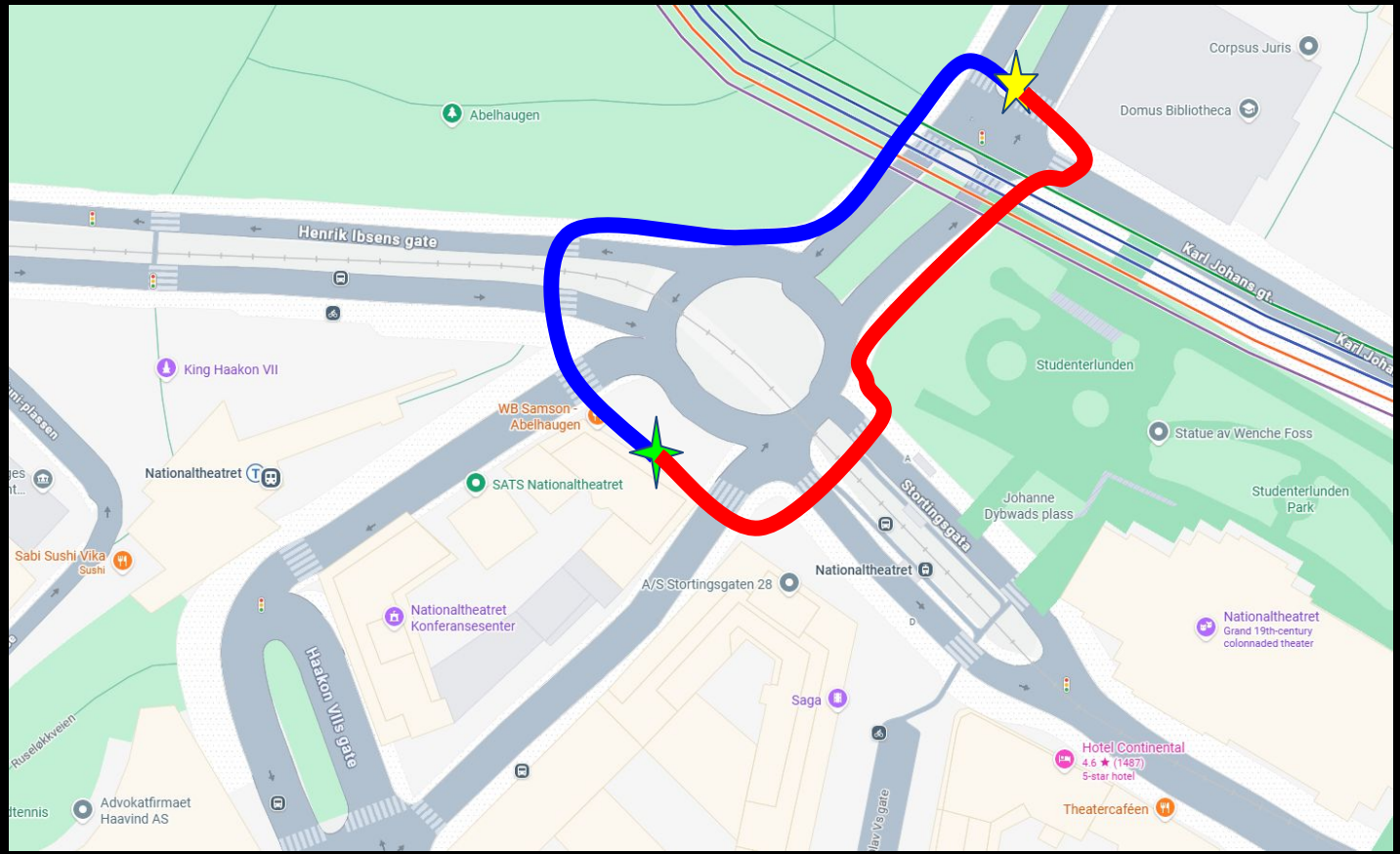
0
Counts
0
2π
4π
6π
8π
10π
Phase shift Φ (rad)


Abelhaugen
Henrik Ibsens gate
King Haakon VII
Nationaltheatret
WB Samson - Abelhaugen
SATS Nationaltheatret
Sabi Sushi Vika
Sushi
Nationaltheatret Konferansesenter
A/S Stortingsgaten 28
Nationaltheatret
Haakon VIIs gate
Saga
Advokatfirmaet Haavind AS
Corpsus Juris
Domus Bibliotheca
Karl Johans gt.
Studenterlunden
Statue av Wenche Foss
Johanne Dybwads plass
Stortingsgata
Studenterlunden Park
Nationaltheatret
Grand 19th-century colonnaded theater
Hotel Continental
4.6 ★ (1487)
5-star hotel
Theatercaféen


Abelhaugen
Henrik Ibsens gate
King Haakon VII
Nationaltheatret
WB Samson - Abelhaugen
SATS Nationaltheatret
Sabi Sushi Vika
Sushi
Nationaltheatret Konferansesenter
A/S Stortingsgaten 28
Nationaltheatret
Haakon VIIs gate
Saga
Advokatfirmaet Haavind AS
Corpsus Juris
Domus Bibliotheca
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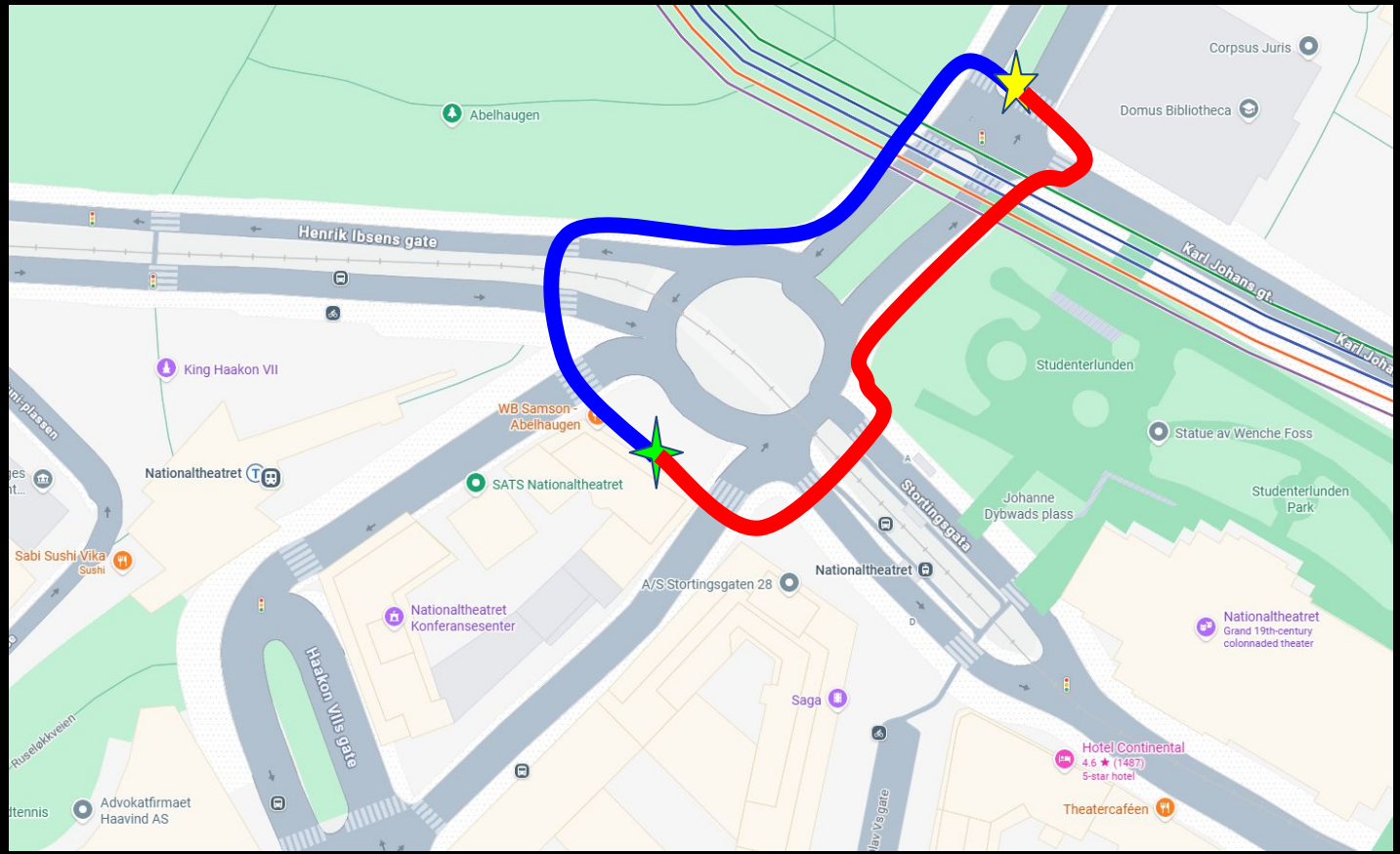
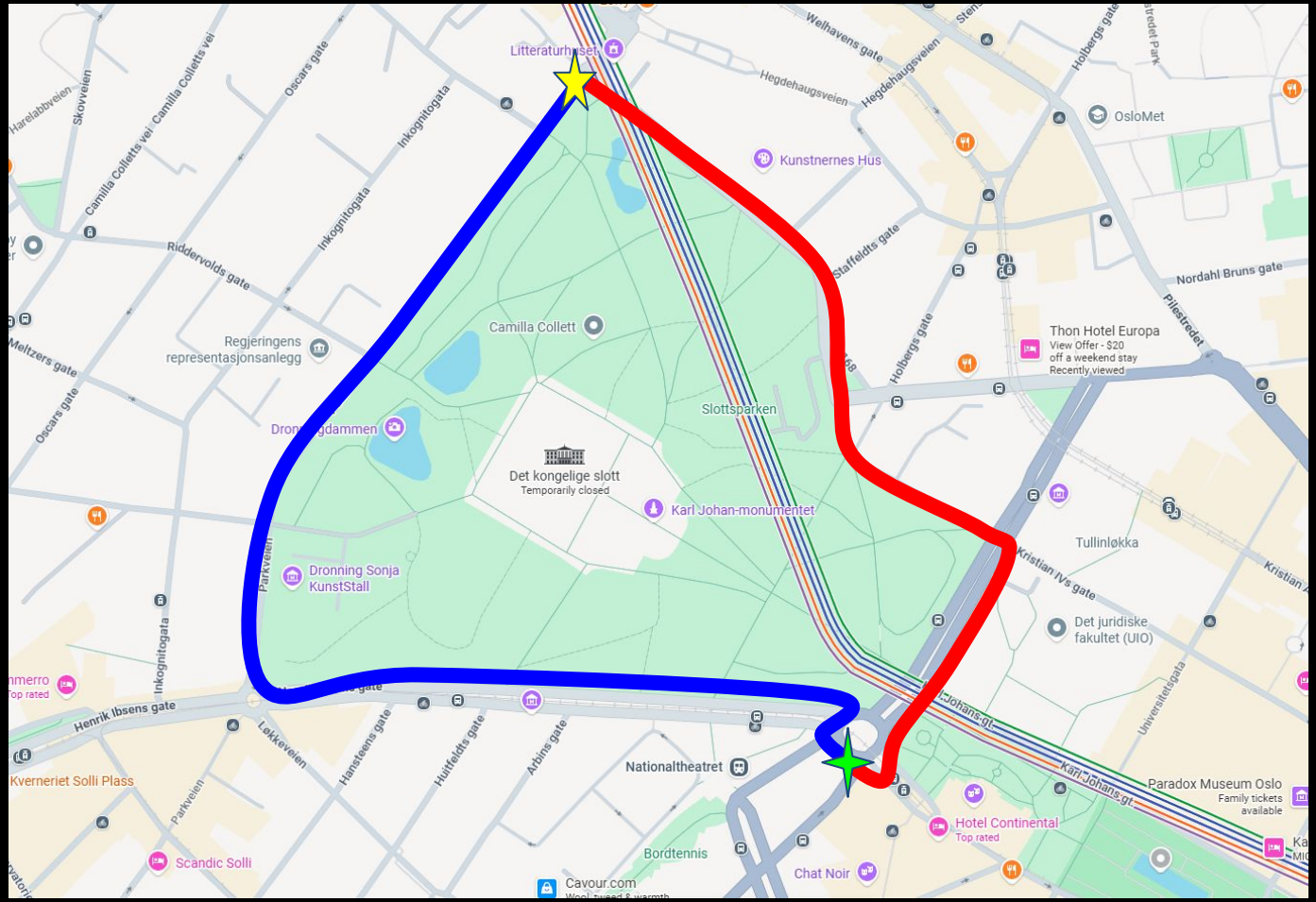
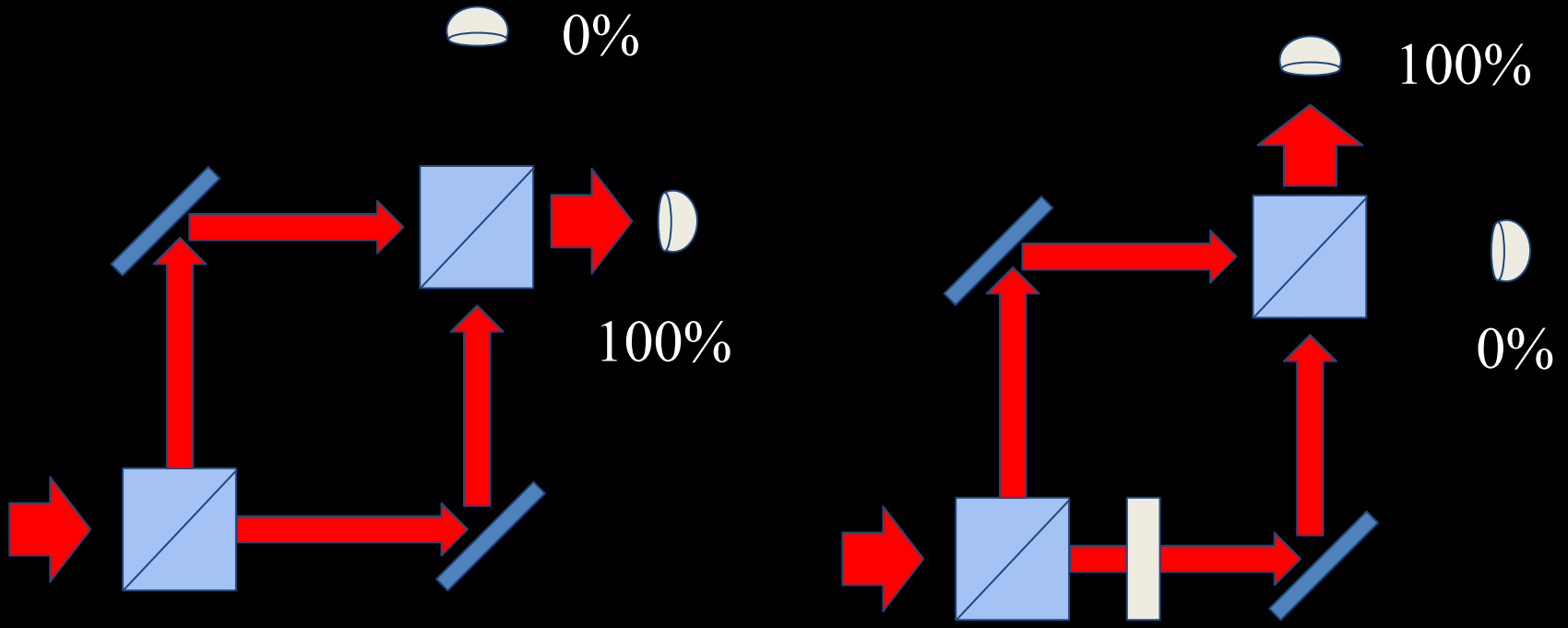
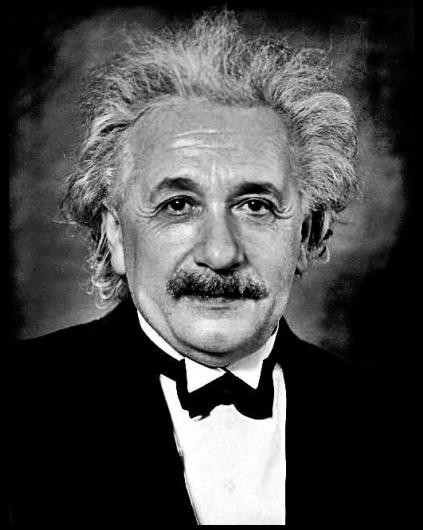
Statue av Wenche Foss
Johanne Dybwads plass
Studenterlunden Park
Stortingsgata
Nationaltheatret
Grand 19th-century colonnaded theater
Hotel Continental
4.6 ★ (1487)
5-star hotel
Theatercaféen

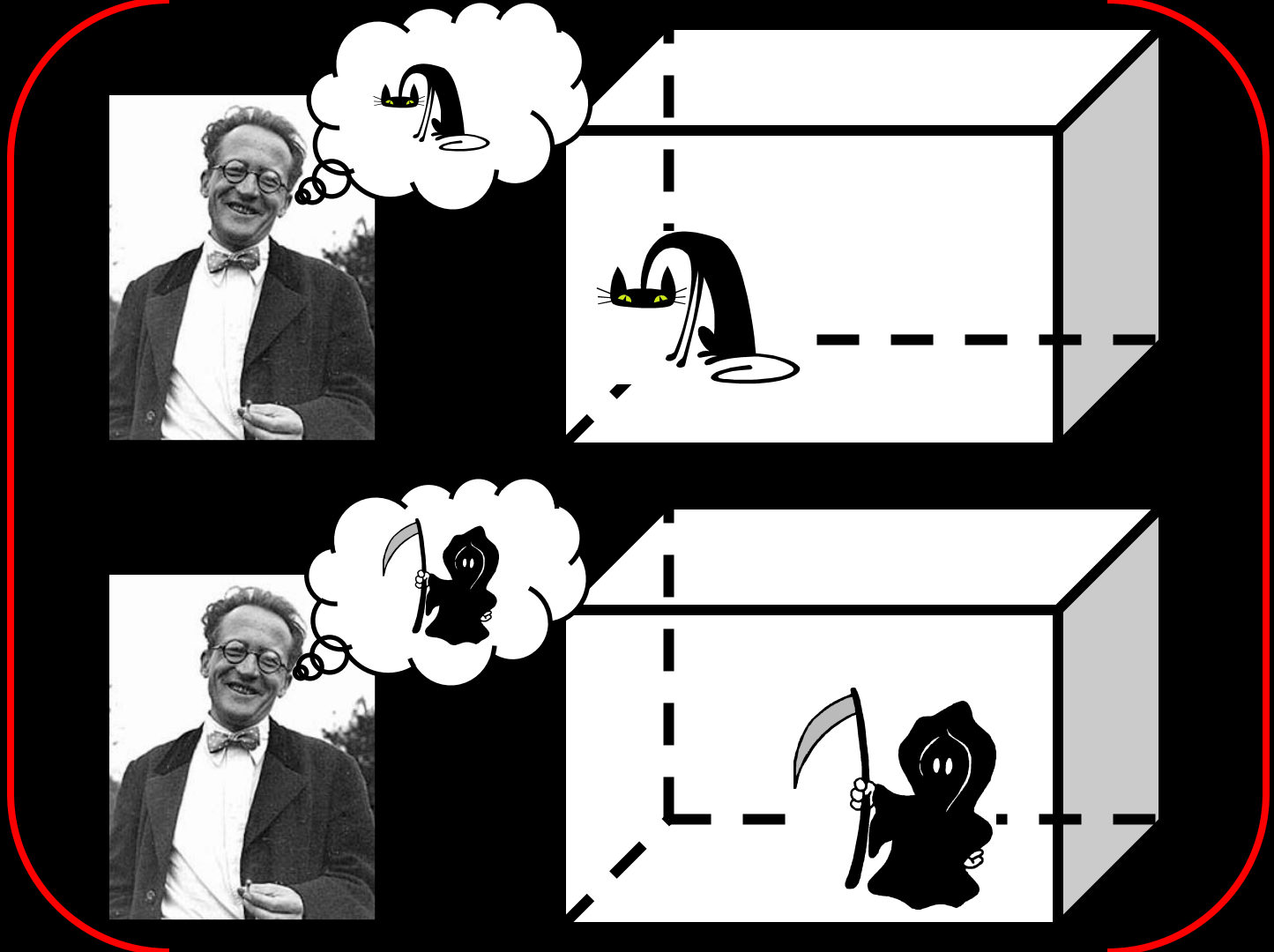

Abelhaugen
Henrik Ibsens gate
King Haakon VII
Nationaltheatret
WB Samson - Abelhaugen
SATS Nationaltheatret
Sabi Sushi Vika
Sushi
Nationaltheatret Konferansesenter
A/S Stortingsgaten 28
Nationaltheatret
Haakon VIIs gate
Saga
Advokatfirmaet Haavind AS
Corpsus Juris
Domus Bibliotheca
Karl Johans gt.
Studenterlunden
Statue av Wenche Foss
Johanne Dybwads plass
Studenterlunden Park
Stortingsgata
Nationaltheatret
Grand 19th-century colonnaded theater
Hotel Continental
4.6 ★ (1487)
5-star hotel
Theatercaféen


Litteraturhuset
Kunstnernes Hus
OsloMet
Camilla Collett
Slottsparken
Det kongelige slott
Temporarily closed
Karl Johan-monumentet
Thon Hotel Europa
View Offer - $20 off a weekend stay
Recently viewed
Regjeringens representasjonsanlegg
Dronning Sonja KunstStall
Tullinløkka
Det juridiske fakultet (UIO)
Nationaltheatret
Hotel Continental
Top rated
Paradox Museum Oslo
Family tickets available
Scandic Solli
Kverneriet Solli Plass
Chat Noir
Bordtennis
Cavour.com
Riddervolds gate
Meltzers gate
Oscars gate
Inkognitogata
Camilla Colletts vei
Skovveien
Harelabbveien
Wergelandsveien
Hegdehaugsveien
Welhavens gate
Holbergs gate
Nordahl Bruns gate
Pilestredet
Staffeldts gate
Kristian IVs gate
Henrik Ibsens gate
Parkveien
Lekkeveien
Hansteens gate
Huitfeldts gate
Arbins gate
Universitetsgata
Karl Johans gt



⇒ Random alternation looks like particles

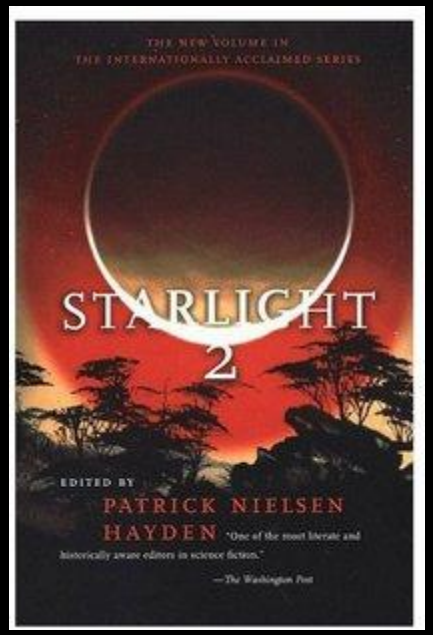




REPRINTS

Divided by Infinity

Robert Charles Wilson



TOR·COM

At birth (or at conception; Soziere wasn't explicit), this span of selves begins to divide, as alternate possibilities are indulged or rejected. The infant turns his head not to the left or to the right, but both. One infinity of worlds becomes two; then four; then eight, and so on, exponentially.

But the underlying *essence of consciousness* continues to connect all these disparate possibilities.

The upshot? Soziere says it all in his title.

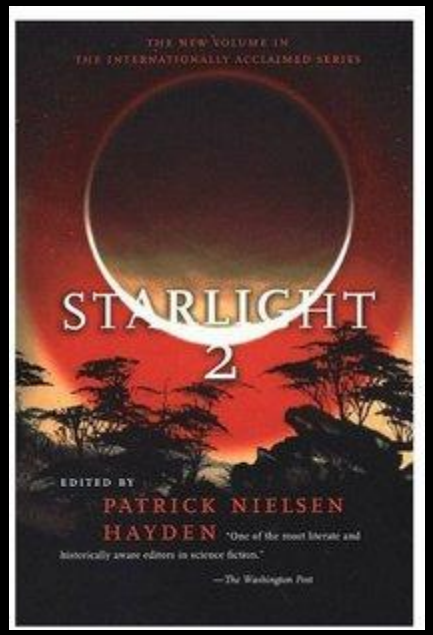
You cannot die.

https://www.tor.com/2010/08/05/divided-by-infinity/

REPRINTS

Divided by Infinity

Robert Charles Wilson



TOR·COM

By definition, you can't experience your own death. Death is the end of consciousness. And consciousness persists. …

I am the one who wakes up in the morning.

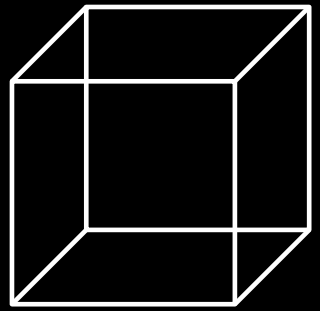
Always.

Every morning.

I don't die.

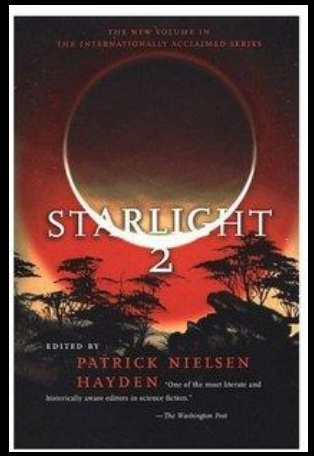
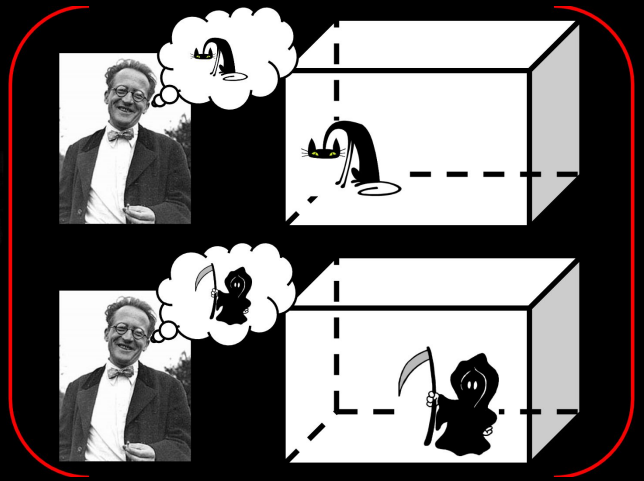
I just become increasingly *unlikely*.

https://www.tor.com/2010/08/05/divided-by-infinity/



Takeaways:

Central role of probability, superposition, ambiguity

Everett: Superpositions continue, expand, entangle

Wavefunction branches exist but become impractical to detect