



# **MEDUSAS SHADOW**

**RADIO PLATENBERG**  
**PROFESSOR DEN MCMORRAN**  
**THE UNIVERSITY OF OREGON SCIENCE COMIC FELLOWSHIP PROGRAM**

In the centuries predating the Contact age,



the human race was lonely.

So unbearable was their isolation that they spent centuries channeling  
a signal to sweep through the galaxy,



wishing desperately for proof that they were not alone.

And  
eventually,



Their wish  
for contact  
was granted.

An alien species emerged from the dark recesses of space,  
heeding their call.

They set their  
sights upon  
humanity,

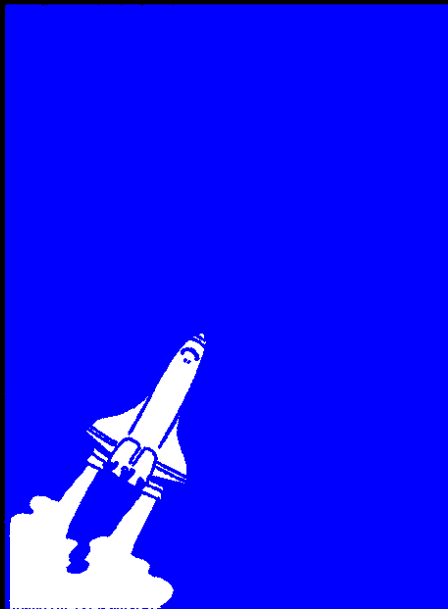
Bright,  
piercing.



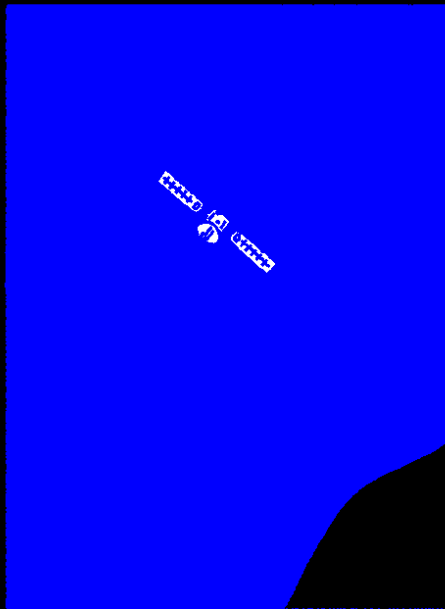
And without a second glance, they snuffed out humanity's birthplace  
between thumb and forefinger.



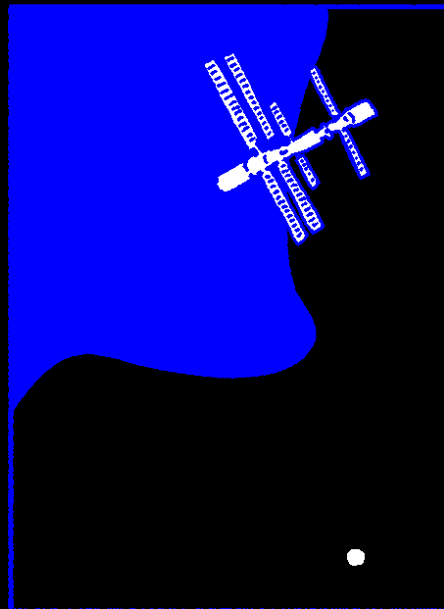
As Earth crumbled away into the recesses of space, there were numerous attempts made to escape total annihilation, to look upon our doom.



Shuttles,



Satellites,

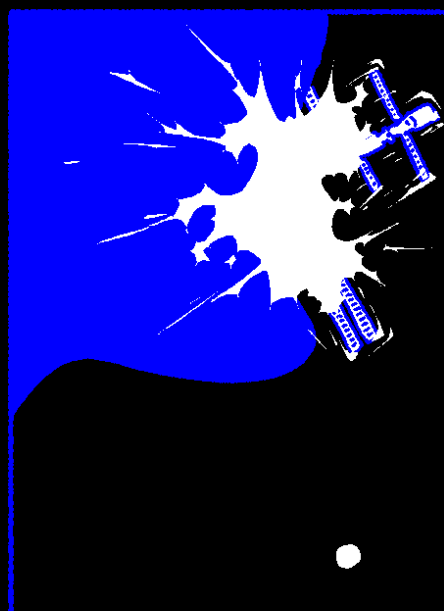
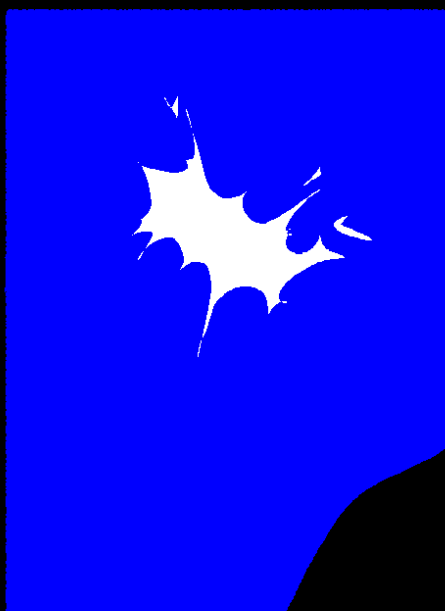
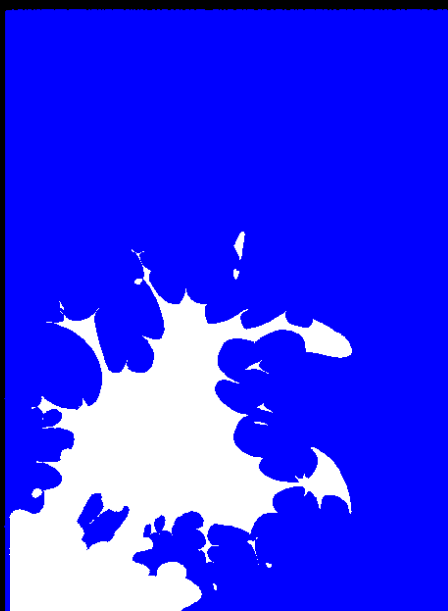


Space Stations.

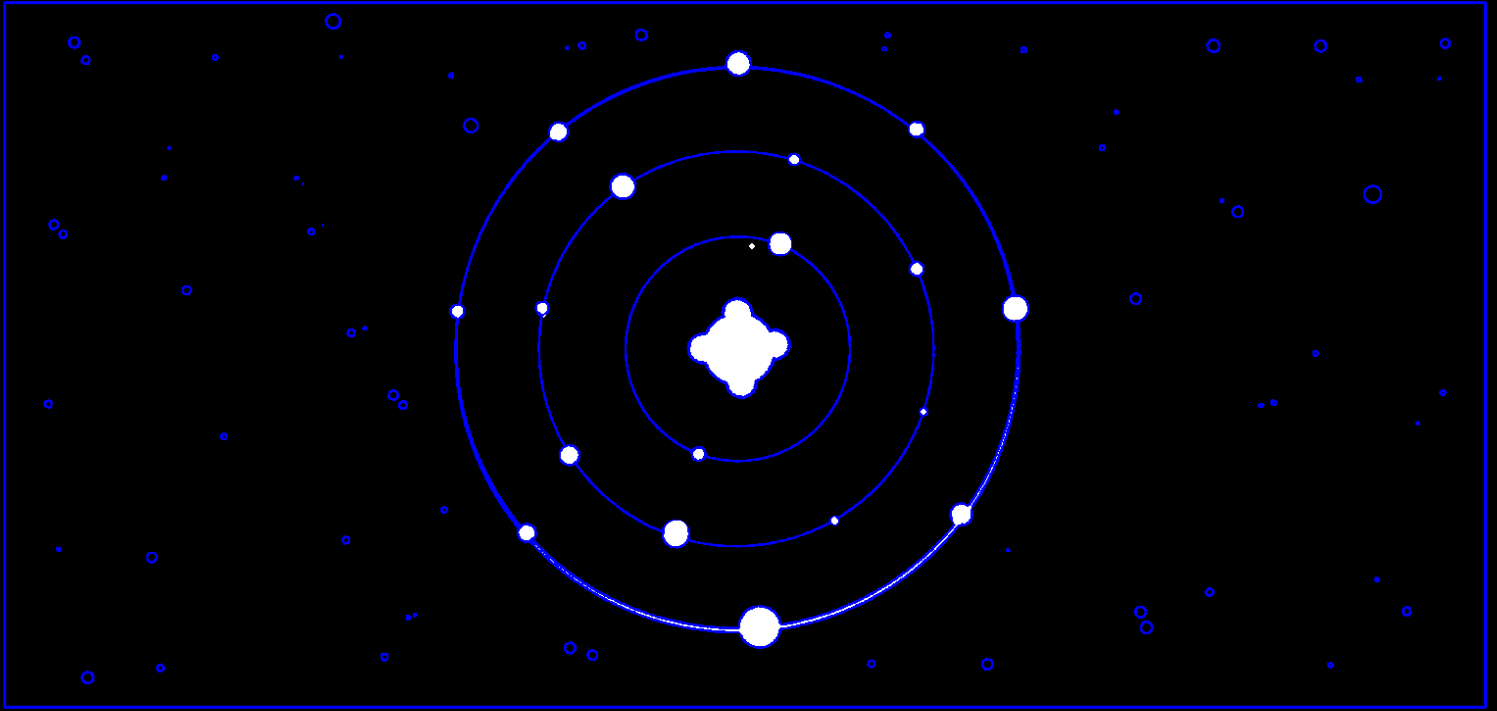
Most failed.

Whatever the alien force could see, it would immediately destroy.

If you saw it, it had already seen you.



However, a crumb of humanity went unnoticed, un-devoured.

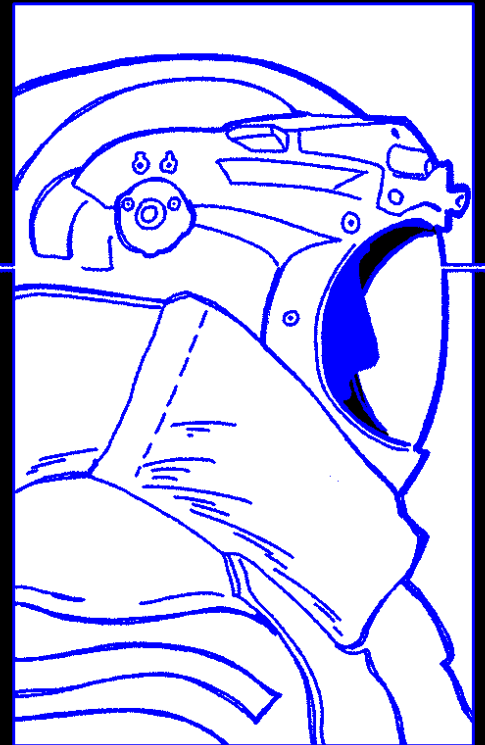


The final vestiges of humanity are now contained within a fleet of nomadic satellites, desperate to evade complete annihilation.



In a last ditch effort to escape detection and subsequent destruction,

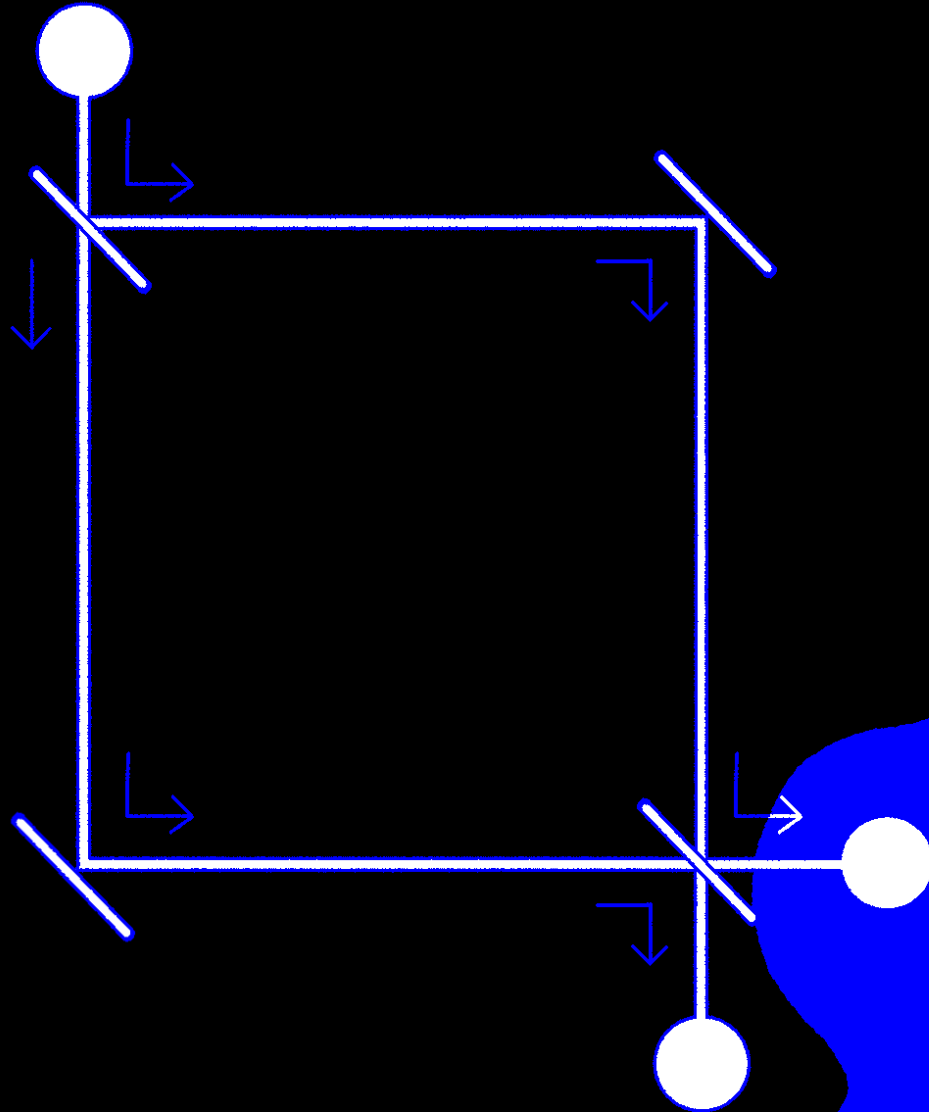
our argonauts have been altered on a molecular scale, imbuing them with the same properties of a singular photon.



After undergoing these alterations, our fleets are now capable of executing a near flawless evasion through the utilization of the procedure known colloquially as:

# ELITZUR-VAIDMAN PROTOCOL

The Elitzur-Vaidman protocol is a large-scale replication of its namesake, the **Elitzur-Vaidman effect**: a quantum mechanics thought experiment that uses interaction-free measurements to verify the presence of an object.



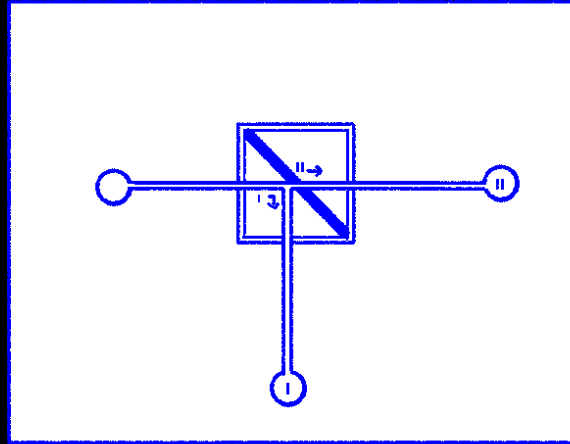
In essence, this allows our fleets to verify the alien force without ever actually detecting it, as falling within the blue range of her gaze would signal imminent destruction.

In this way, we can safely identify which routes would grant us safe passage through space, charting our way to new planetary candidates for humanity's new home.

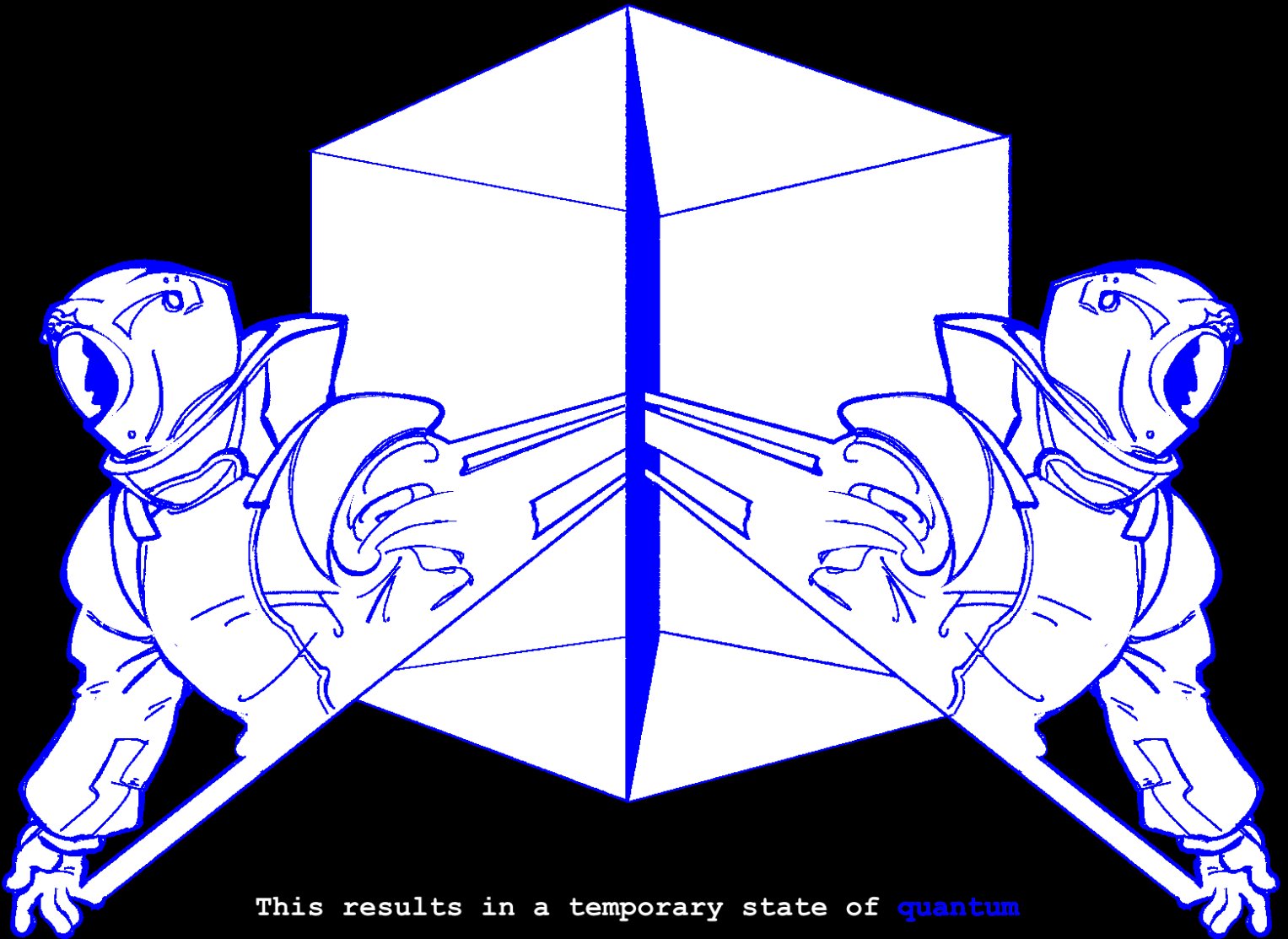


The execution of the Elitzur-Vaidman Protocol is simple:

A singular bomb detector (now equivalent to a singular light photon) is sent through a beam splitter.



When they reach the beam splitter, they will simultaneously do two things: be reflected off of its surface, and pass through it.

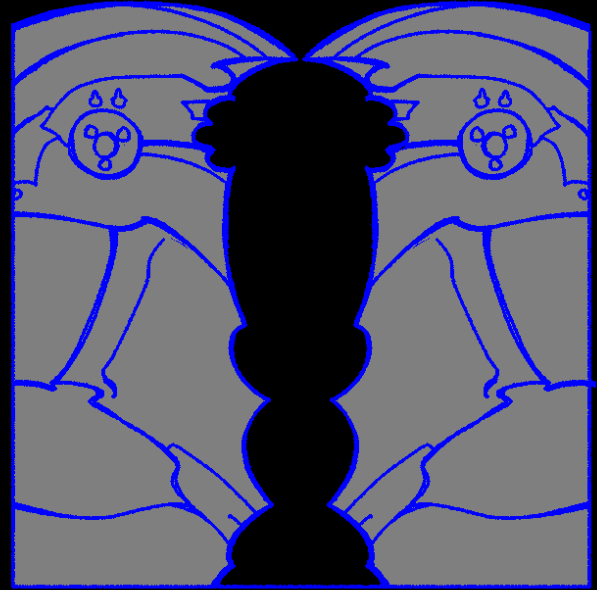


This results in a temporary state of **quantum superposition**, in which the photon is capable of remaining in multiple states until it is measured.

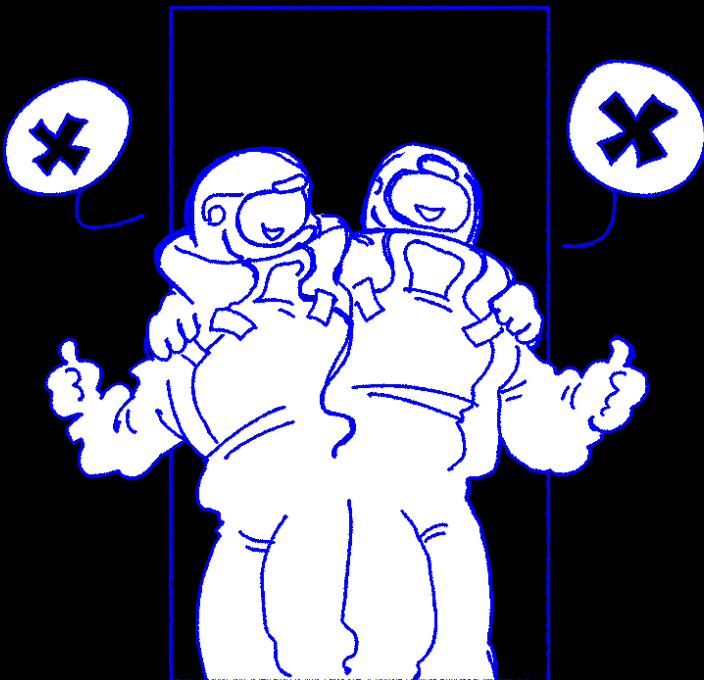
When the bomb defusers meet at the secondary beam splitter, they will effect each other through a process known as **interference**.



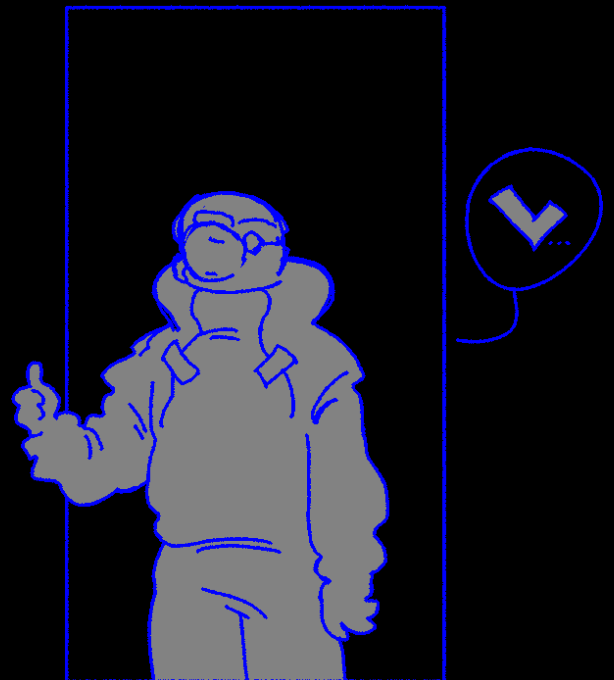
They will either recombine into a singular bomb defuser through **constructive interference**,



Or overwrite each other, weakening through a case of **destructive interference**.

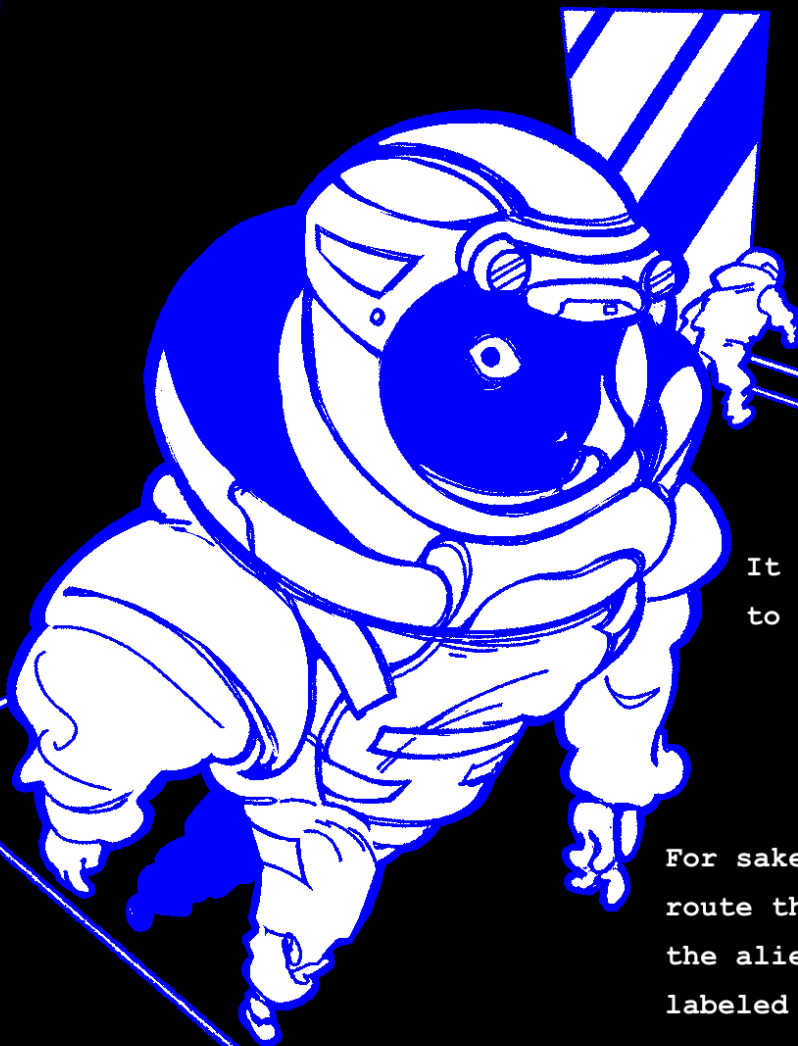


If the detectors interfere with one another, the presence of the secondary detector indicates that there is no alien presence, and it is safe to proceed down either route.



If only one detector makes it to the mirror, it indicates that the alien force is indeed present.

Before they interfere with one another, both "upper" and "lower" route detectors will reach an ordinary mirror, which redirects them into intersecting at a secondary half-silvered mirror.



It is upon one of these paths to an interference point that the alien force will be present.

For sake of convenience, the route that intersects with the alien force will be labeled the "lower" route.

In the hypothetical where the alien force is present, there are three possible outcomes:

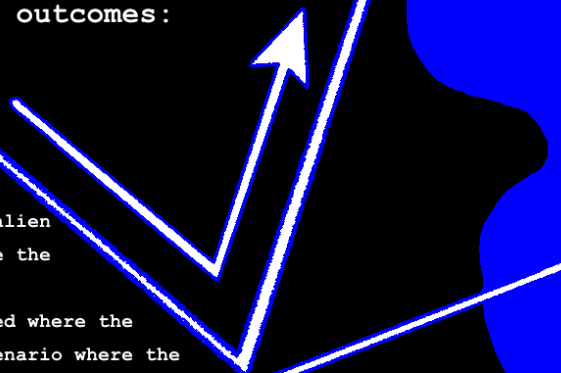
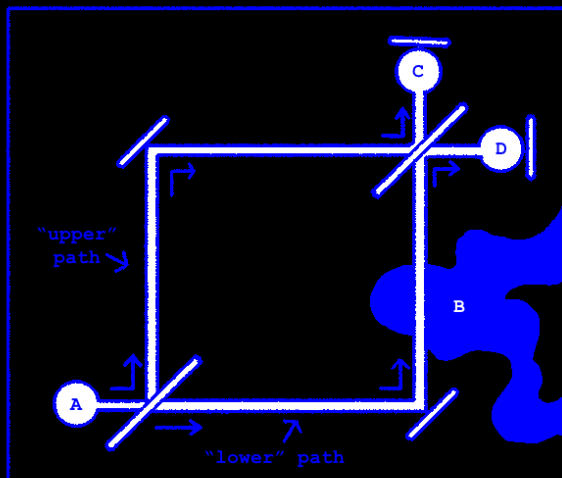
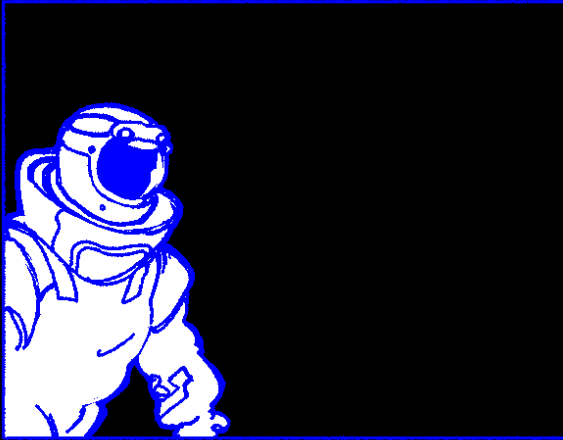


Diagram of the Circuit

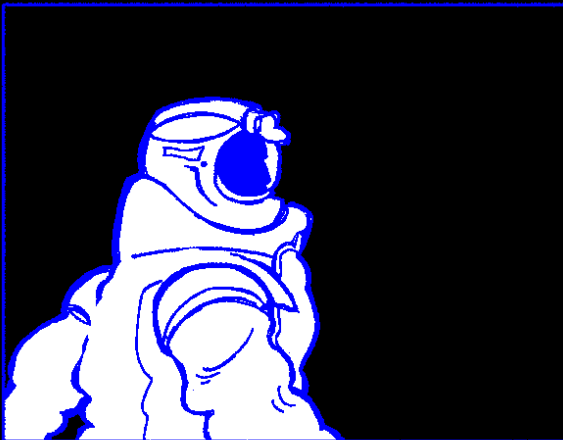
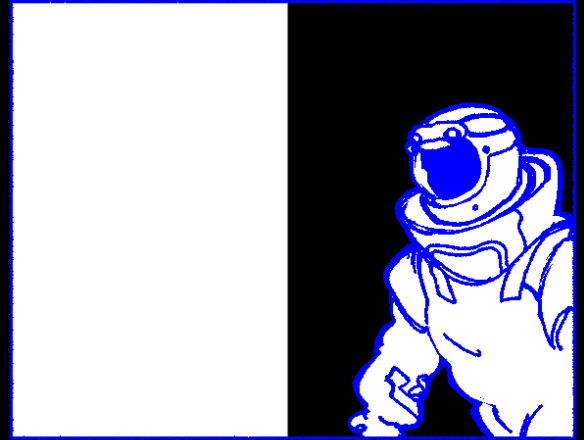


Key:

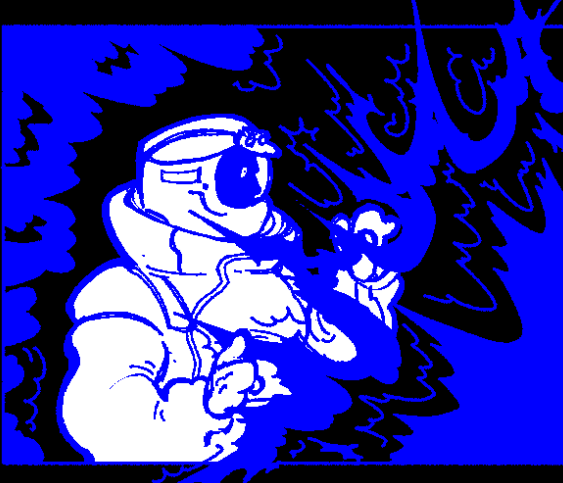
- A = emitting point, singular "photon"
- B = the location of the alien
- C = a sensor placed where the photon may end up
- D = a second sensor placed where the photon ends up in the scenario where the alien is detected and NOT alerted



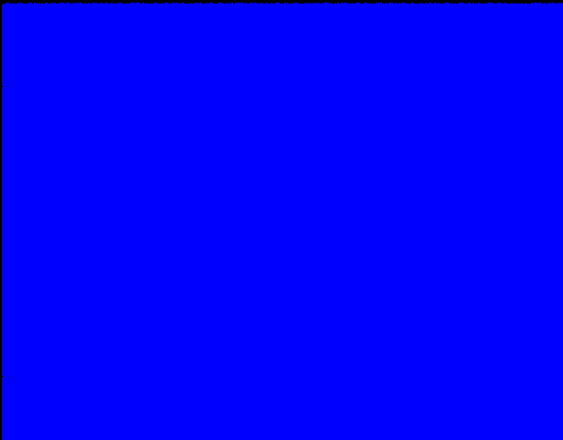
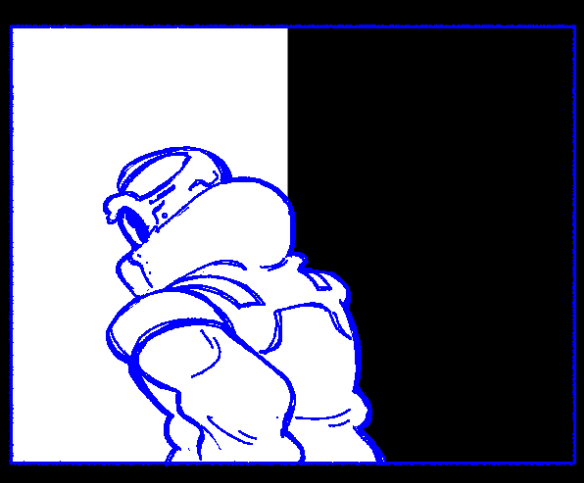
There is a 25% chance that the detectors will simultaneously re-enter the second mirror, signifying that the alien force is absent.



There is another 25% chance that only one detector will return from quantum superposition and activate sensor D, signifying that the alien force is present without alerting it.



There is a 50% chance that the detonator will intersect with the force, subsequently leading to their death and the destruction of the human fleet.



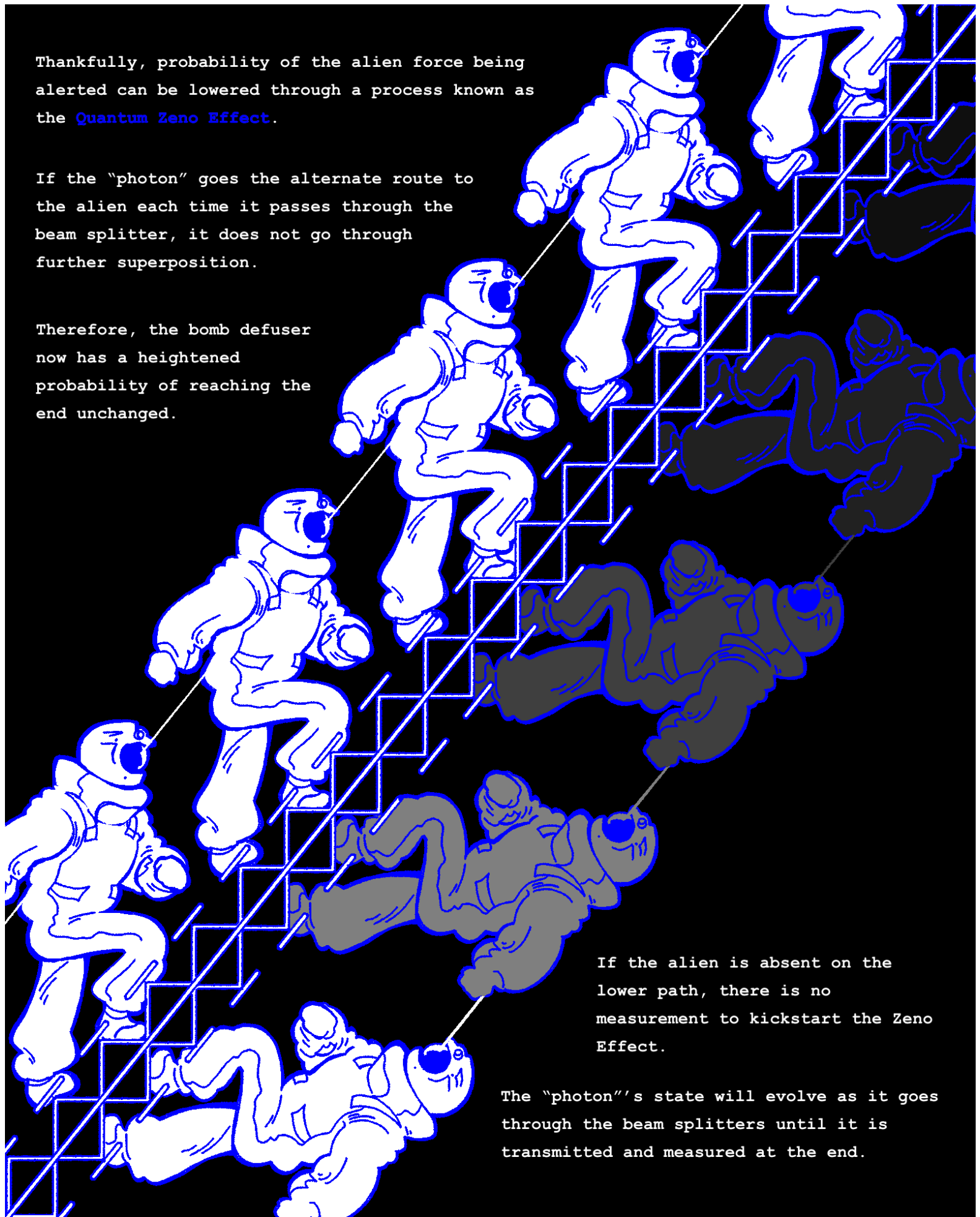
With a 25% chance of a safe detection and a 50% chance of a deadly encounter, these odds are not considered favorable.



Thankfully, probability of the alien force being alerted can be lowered through a process known as the [Quantum Zeno Effect](#).

If the "photon" goes the alternate route to the alien each time it passes through the beam splitter, it does not go through further superposition.

Therefore, the bomb defuser now has a heightened probability of reaching the end unchanged.



If the alien is absent on the lower path, there is no measurement to kickstart the Zeno Effect.

The "photon"'s state will evolve as it goes through the beam splitters until it is transmitted and measured at the end.

And once that proton is measured, once the remainders of humanity  
pieces together a path devoid of medusa's shadow,

We will weave through that path like a shooting star,

until it no longer stretches over us.

