SURF x BNL

Daniel Reyes


BNL
(Sleep Deprived)

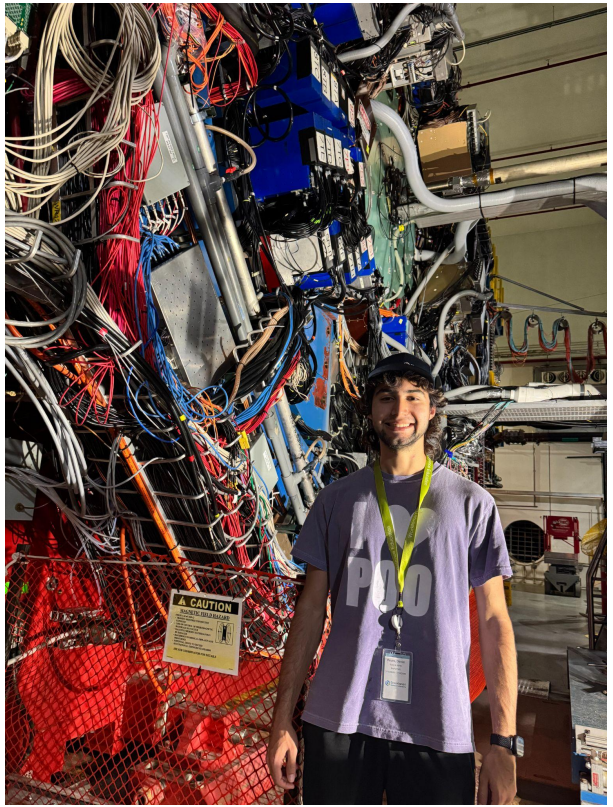
STAR

Collides **heavy ions** (like gold nuclei) at nearly the speed of light

Recreates extreme temperatures and densities - over **100,000 times hotter than the Sun**

Tracks thousands of particles produced in each collision to study:

- **QGP formation and evolution**
- **Hadronization** (how free quarks form particles)
- **Spin structure of the proton**



Scintillator Lab

Purpose:

- Develops and tests **scintillating materials** that emit light when struck by radiation.

What They Do:

- Improve **light yield**, **timing**, and **durability** of materials.
- Study both **organic** and **inorganic** scintillators.
- Optimize for use in **neutrino detectors**, **dark matter experiments**, and **medical imaging**.

Techniques:

- Measure **light output**, **decay time**, and **wavelength**.
- Test performance with radiation sources and cosmic rays.

NEW YORK

7/10

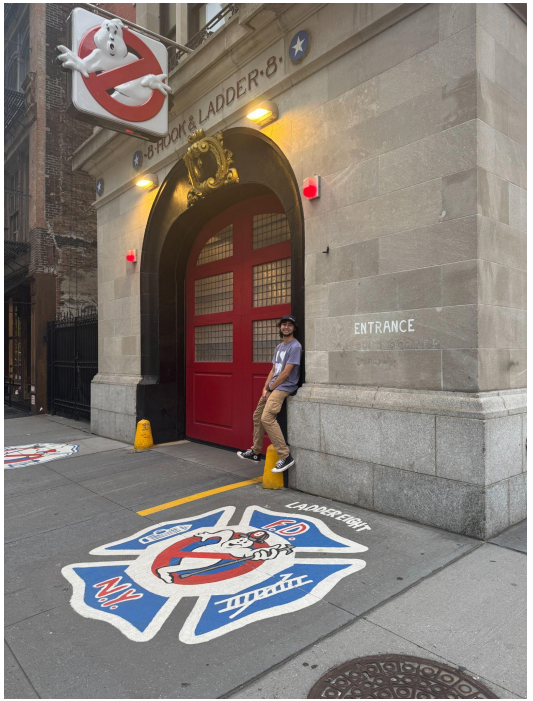
RUDE people, Not a Single excuse me

Pizza good

Hot dog good

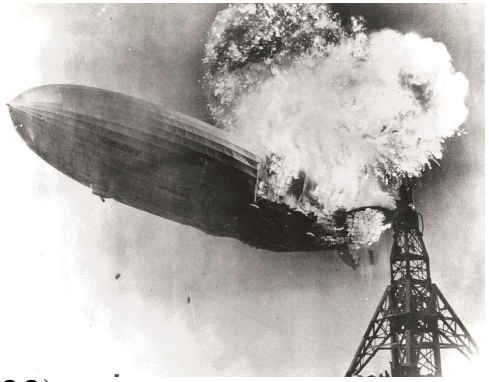
Threw up the chopped cheese but it good

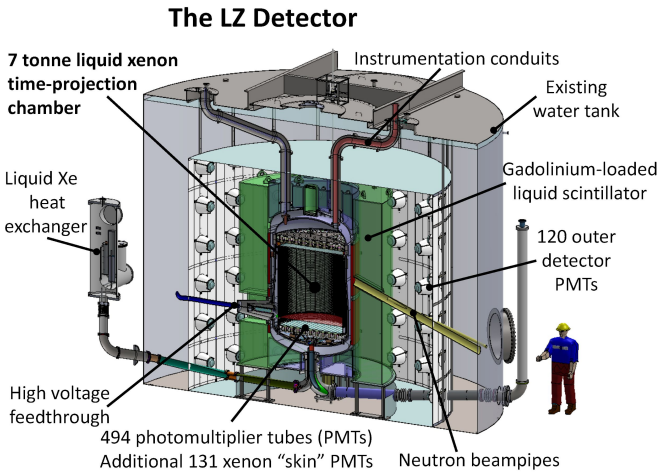
Would go back to south dakota




SURF
Iron Sword
+6.0 Attack Damage

LUX-ZEPLIN (LZ)





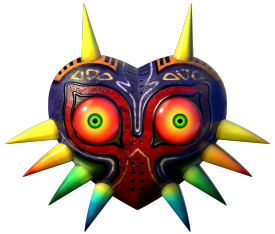
Type: Dark Matter Detector

Status: Active (data-taking began ~2022)

What it does:

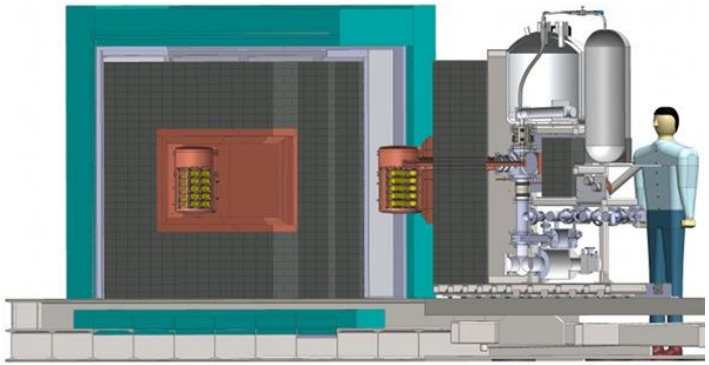
- Uses 10 tonnes of **liquid xenon** to search for **WIMPs** (Weakly Interacting Massive Particles) - dark matter candidates.
- Detects faint flashes of light and electrons from nuclear recoils inside the xenon.

MAJORANA



Type: Neutrinoless Double-Beta Decay Detector

Status: Active (R&D phase largely complete; being decommissioned)



What it does:

- Looks for **neutrinoless double-beta decay** in enriched germanium-76.
- If detected, it would mean neutrinos are **Majorana particles** (their own antiparticles) and provide insight into absolute neutrino mass.
- Highly shielded to reduce background noise.

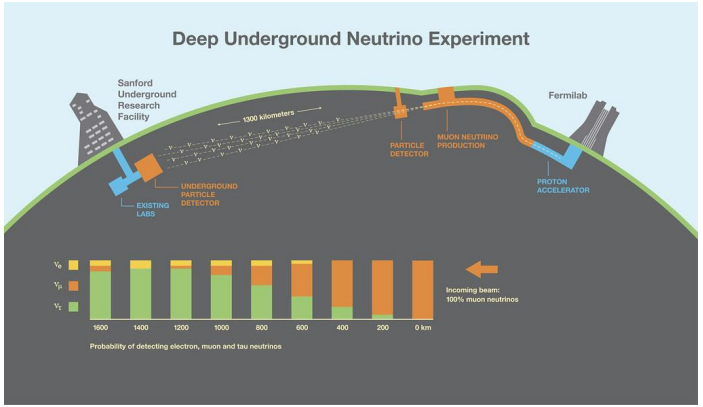
DUNE

DEEP Underground Neutrino Experiment

Will:

- Measure neutrino oscillations and mass hierarchy
- Detect CP violation → possible clue to matter–antimatter imbalance

- Observe supernova neutrinos in real time
- Search for proton decay



HomeStake Mines In South Dakota

10/10

Only payed attention to DUNE

South Dakota is cool

Neutrino Day was cool

(10 Year old wouldn't leave me alone)