

What do physicists do?

Alan Poon (Gabriel's dad)

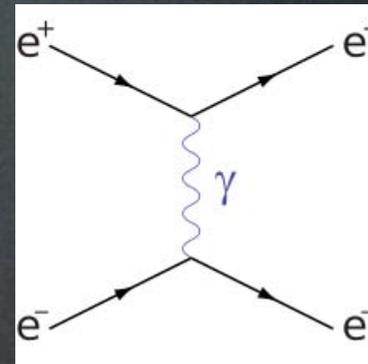
I am a physicist

- I am not a **physician**. You see a physician when you are sick.
- Someone who practices physics is a physicist. I am a **physicist**.
- Physics is the science of matter and energy.

Physicists?

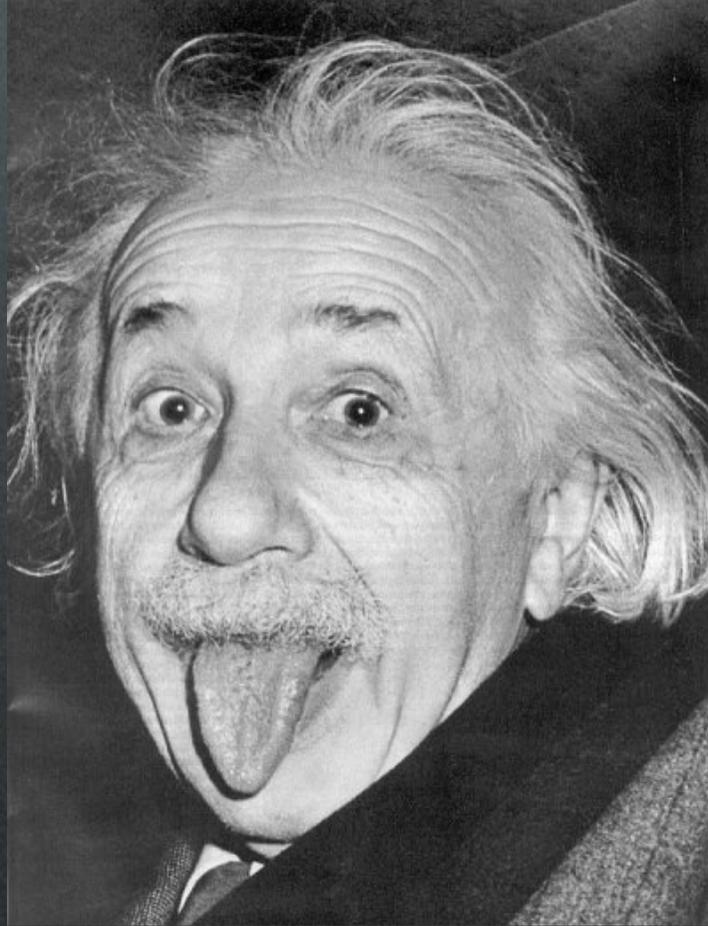
- Some physicists work on math a lot, and try to explain how things work with silly-looking pictures and math:

$$E = mc^2$$



- We call them **theoretical physicists**.
- To tell you the truth, those math are sometimes too difficult for me.

A famous theoretical physicist



Albert Einstein

Physicists?

- I am an **experimental physicist**. I build experiments.
- Experimental physicists try to test phenomena that are predicted by those silly-looking pictures and math.

A famous experimental physicist

Ernest O. Lawrence



- Many places are named after **Lawrence**.
- You will be going to the **Lawrence Hall of Science** on a field trip.
- I work at the **Lawrence Berkeley Lab**.

A telescope

- You can see distant **stars** and **galaxies** with a **telescope**. Large telescopes are usually built on top of a mountain.
- Scientists love their telescopes and give them names. This is **Rachel**:

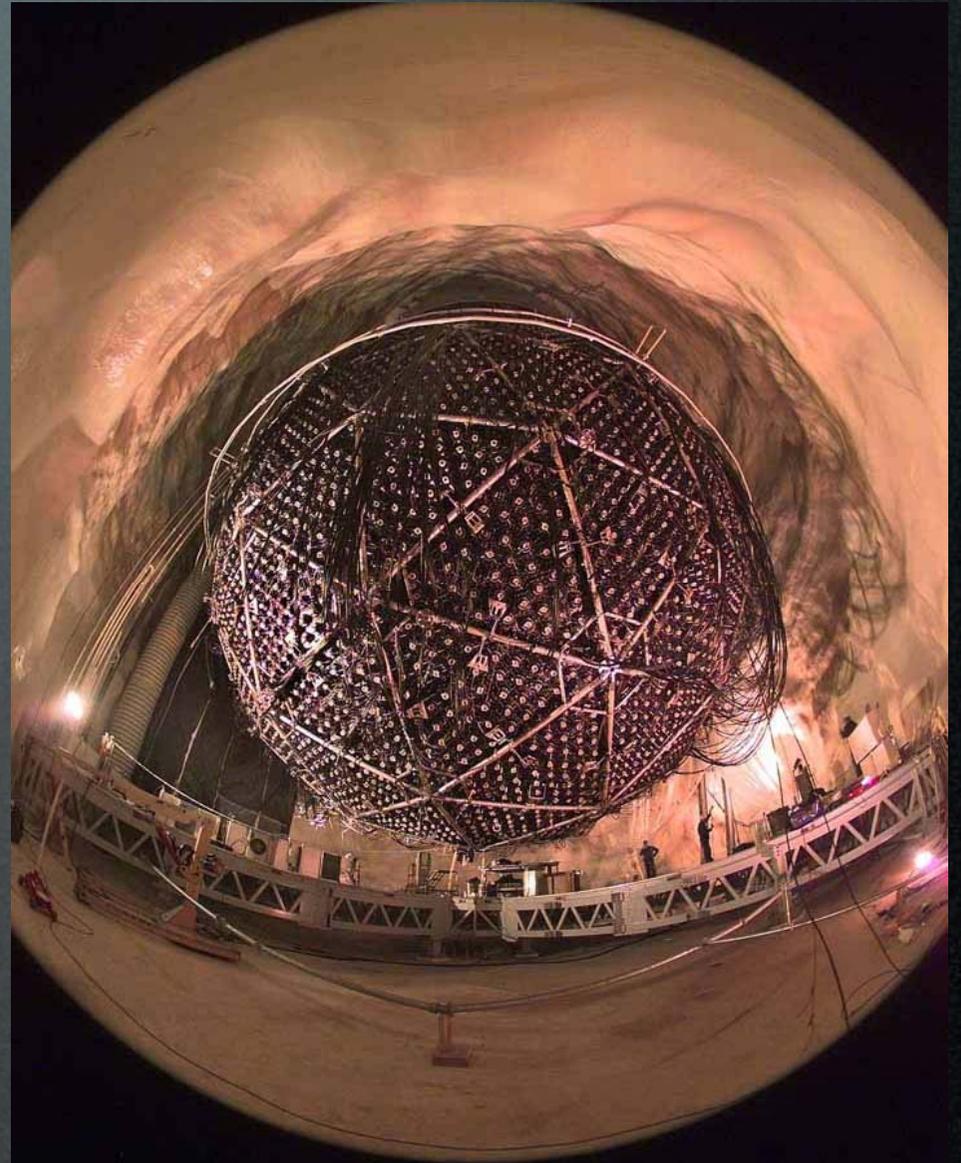


Chabot Space Center, Oakland



What do I do?

- My fellow scientists and I built this telescope.
- We love our telescope, we call it “**SNO**”
- It is located in a **mine** more than a mile below the surface of the earth.
- This telescope has about **10000 eyes**.



Why did you build a telescope underground?

- The **Sun** produces a lot of **heat, light** and **neutrinos**. Neutrinos are very small particles that go through almost everything. SNO catches neutrinos from the Sun.
- But there are **cosmic rays** from outer space. The Earth can stop cosmic rays, but not neutrinos. We can find the neutrinos more easily if the telescope is deep underground.

Can you find me?



No, there are too many people!

Can you find me?



Maybe, if you look very carefully.

Can you find me?



Yes, because there are fewer people in the picture.
If there are fewer cosmic rays, it is easier to find
neutrinos too.

SNO

- SNO is located in Sudbury, **Canada**.
- I came from Canada. I am a **Canadian**.
- It is **cold** in most part of Canada in the winter.
- How cold? It can get below 0 degree.

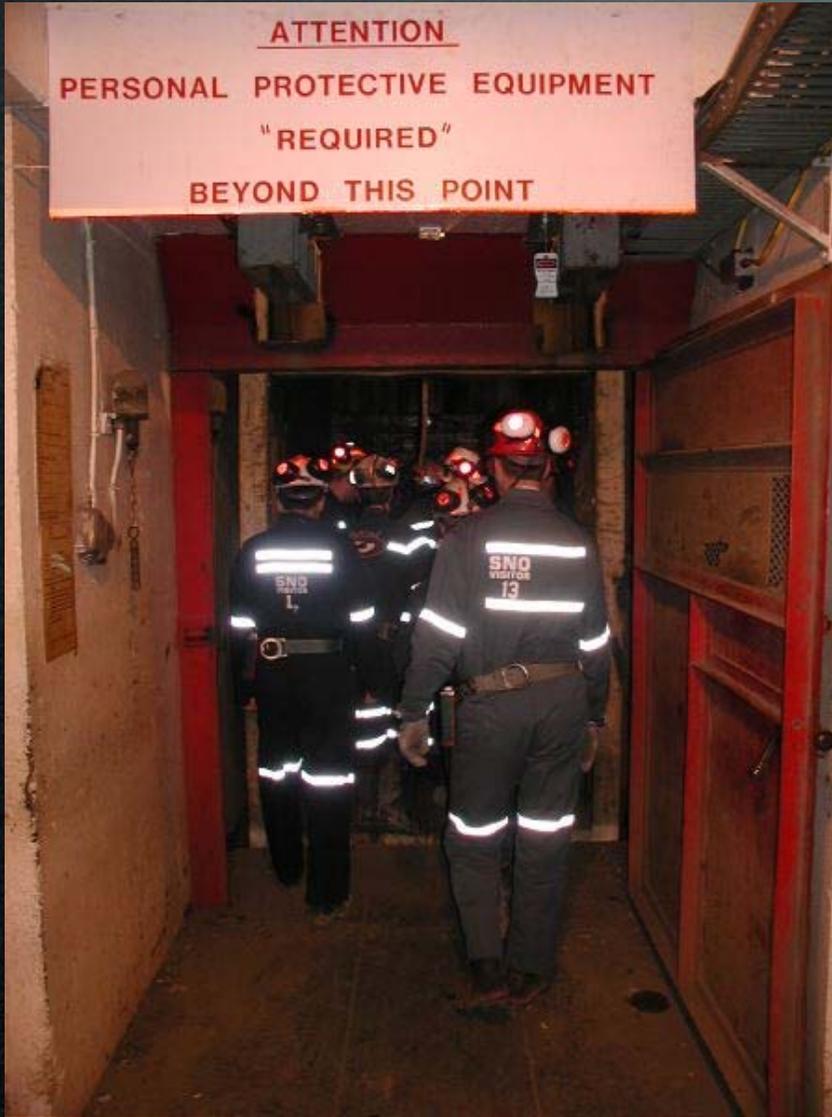


My work day in Canada



I drive to work. In the winter, there is a lot of snow on the ground. This is the entrance to the mine.

My work day in Canada



I take the **elevator** down to the mine. There are miners and my fellow physicists in the elevator.

My work day in Canada



After we get off the elevator, we walk a mile to our
laboratory.

My work day in Canada



The blue door is the entrance to the laboratory.

My work day in Canada



Then we take off our miner clothing and shower. We have to be very **clean** when we work on SNO.

My work day in Canada



I take a break after shower! The TV does not show any cartoon or movie.

My work day in Canada



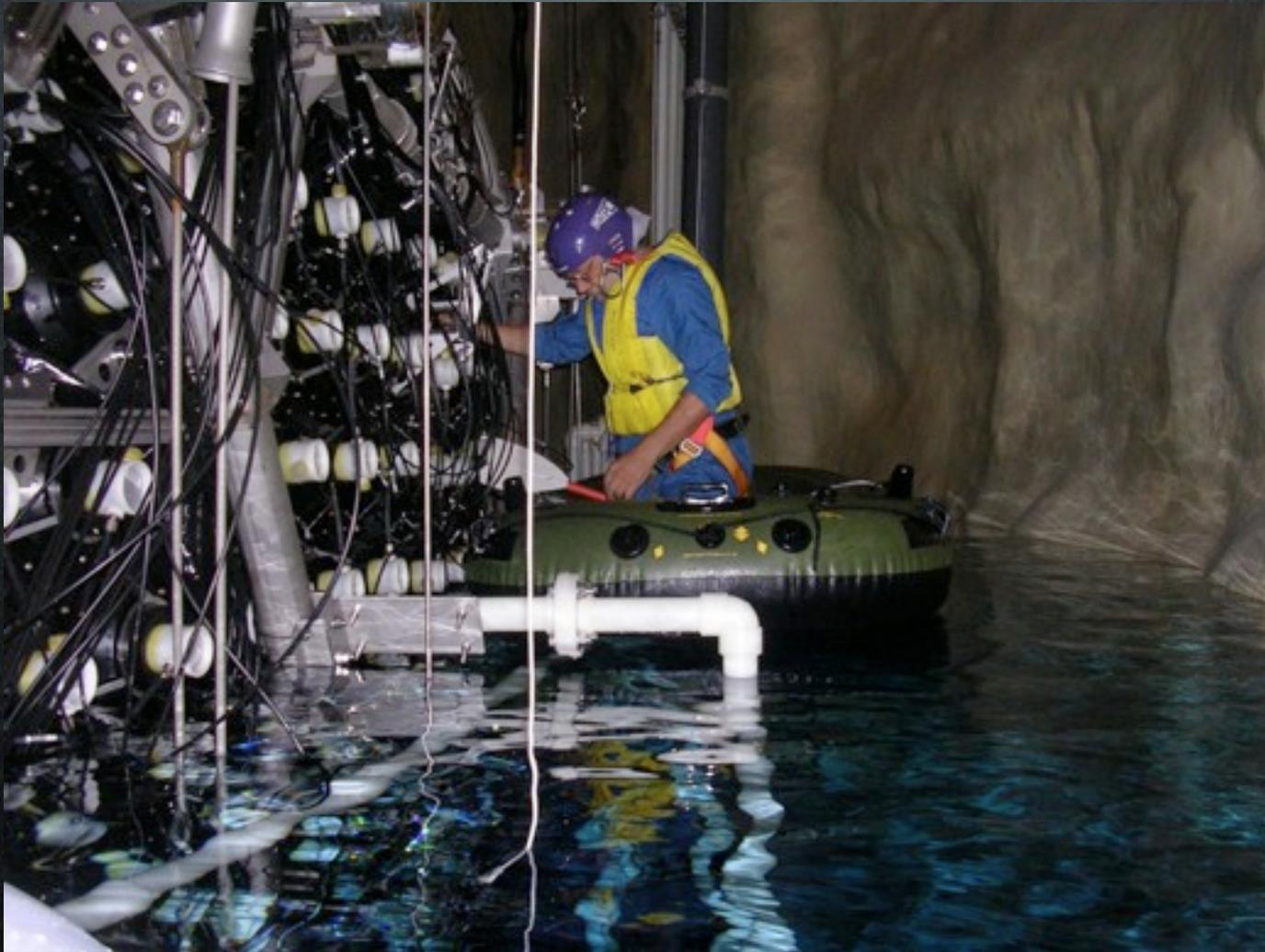
Every scientist has a hard hat (helmet) in the SNO lab.

My work day in Canada



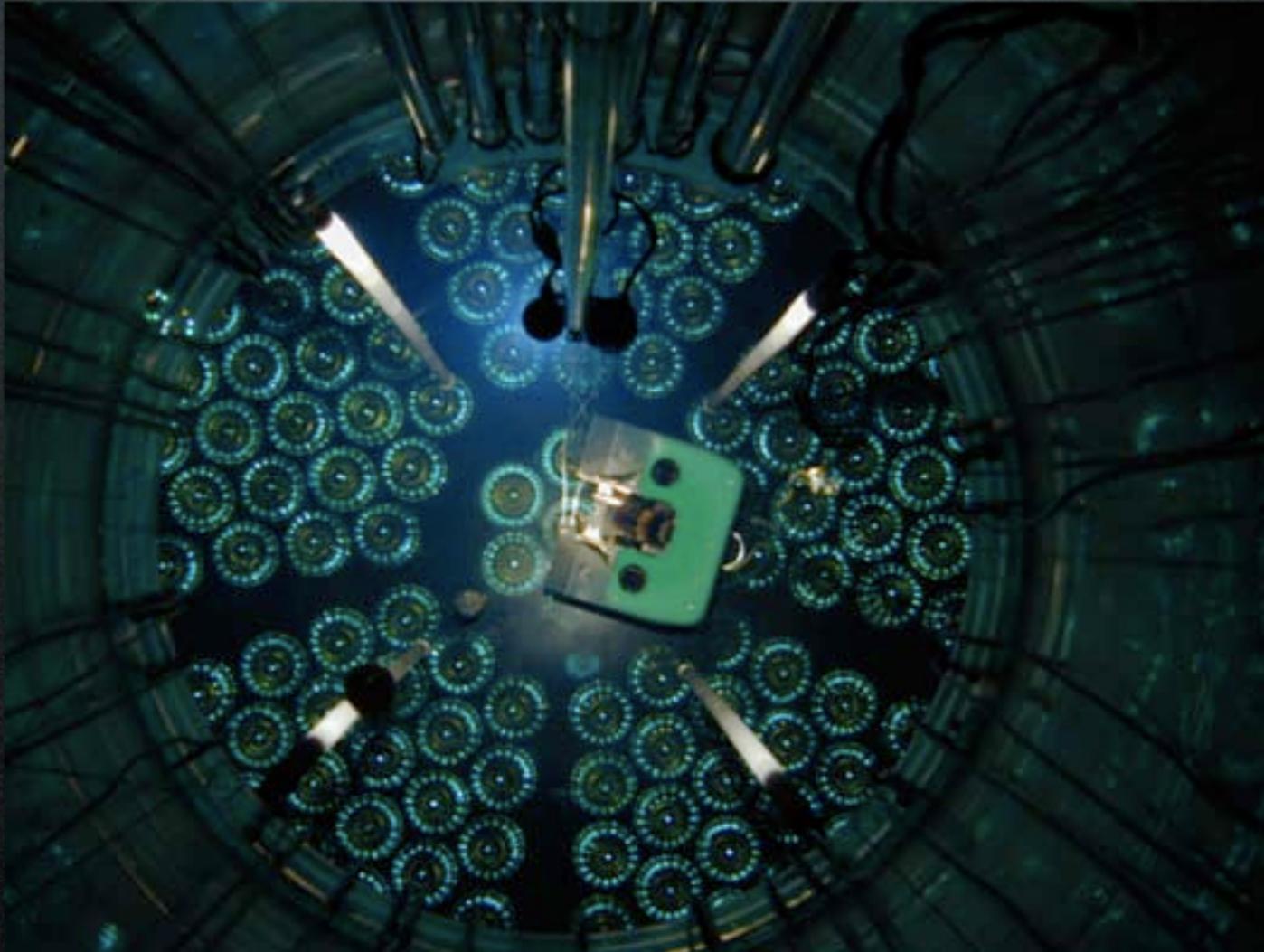
SNO uses a special type of water to catch neutrinos. It is called **heavy water**. It costs over 300,000,000 luck bucks. We work on the plumbing a lot.

My work day in Canada



We have to check on SNO sometimes.
We use a rubber boat.

My work day in Canada



We send a **submarine** into SNO sometimes.

My work day in Canada



Young students **pilot** the submarine because they are good at video games.

My work day in Canada



When something does not work well, I need to fix it.

My work day in Canada



At the end of the day, we walk back to the elevator.
It takes us back to surface.

My work day in Canada



When I get back to the office, I send Gabriel an email.

My work day in Berkeley

- When I am not in Canada, I look at the data from SNO.
- I write **computer programs** to study them.
- I will show you some of the neutrinos that were caught by SNO.

Lecturing

- Sometimes, I have to teach college students and graduate students. They want to become scientists in the future.
- I also travel to other universities or to conferences to tell others about SNO.



Teaching kids

- Sometimes, I give science **demonstrations** at elementary schools. Some of the students want to become a scientist.



Teaching kids

- Do you know which is my most favorite classroom?

Teaching kids

- Do you know which is my most favorite classroom?

Room 8 at Joaquin Miller Elementary!