

What is Health Physics?

Health Physics is an interdisciplinary science dedicated to promoting the practice of radiation safety. It combines the elements of physics, biology, chemistry, mathematics, statistics, and electronic instrumentation. As a profession, health physics is taught in many universities around the world. Degrees will range from a four-year BS to a PhD. Most professional-level health physicists have an MS degree, although it is not required in many work situations.

Wilhelm Conrad Roentgen (1845-1923)



Conrad Röntgen (1901) Nobel Prize
in Physics

Antoine Henri Becquerel (1852-1908)

Uranium emitted radiation without an external source of energy such as the sun.

Becquerel had discovered radioactivity, the spontaneous emission of radiation by a material.

Later, Becquerel demonstrated that the radiation emitted by uranium shared certain characteristics with X rays but, unlike X rays, could be deflected by a magnetic field and therefore must consist of charged particles. For his discovery of radioactivity, Becquerel was awarded the

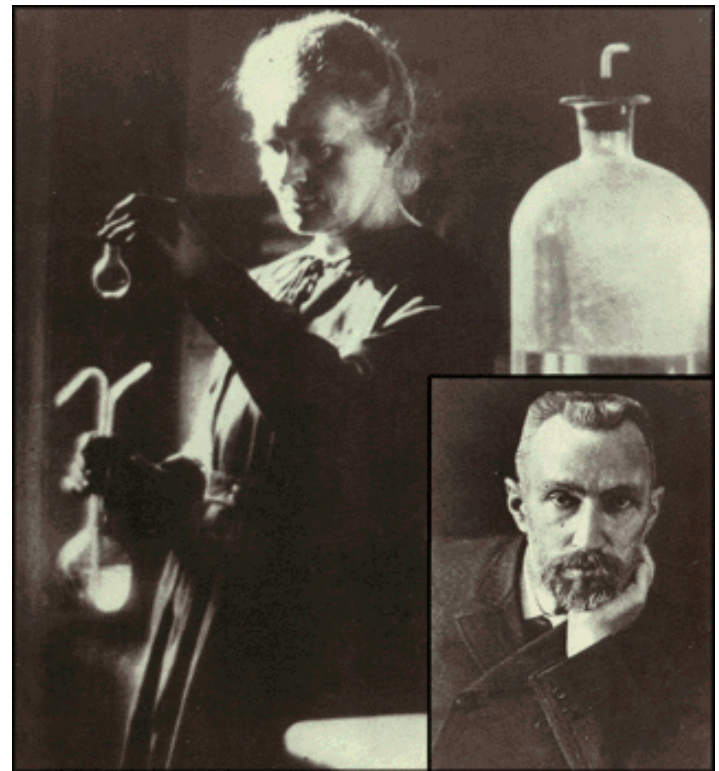


Pierre Curie (1859-1906)

Marie Curie (1867-1934)

Marie Curie, the first woman to receive the Nobel Prize in the sciences - and she won two! The first was in physics (1903) for the discovery of radium (together with Pierre Curie and Henri Becquerel).

The second was in chemistry (1911), for creating the process used to separate radium and polonium out of pitchblend. This process is still used today in the chemical industry.



We ensure compliance with the NRC licenses

1. Environmental sampling

- **Soil**
- **Grass**
- **Water**
- **Air emissions**

2. Reactor surveys

- **Radiation surveys**
- **Swipes for contamination**

3. Survey Instruments

- **Purchase**
- **Service**
- **Calibrate**

4. Perform special responses

5. Analyze & Ship samples

6. Process waste

How do we protect people from radiation?

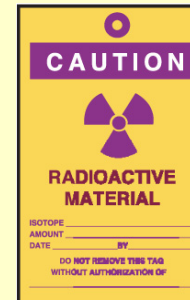
Two concepts

- 1.) No exposure without a net benefit
- 2.) ALARA (**A**s **L**ow **A**s **R**easonably **A**chievable)

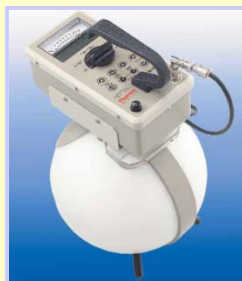
Some ways to ensure safety:

- use **engineered safety features** (glove boxes, hoods, gate switches, shielding. good design of equipment)
- use **administrative controls** (agreeing to follow rules, procedures, signs, work permits)
- require **training** (example: learn time, distance, shielding)

Labels, Signs, Ropes



What instruments do we use?



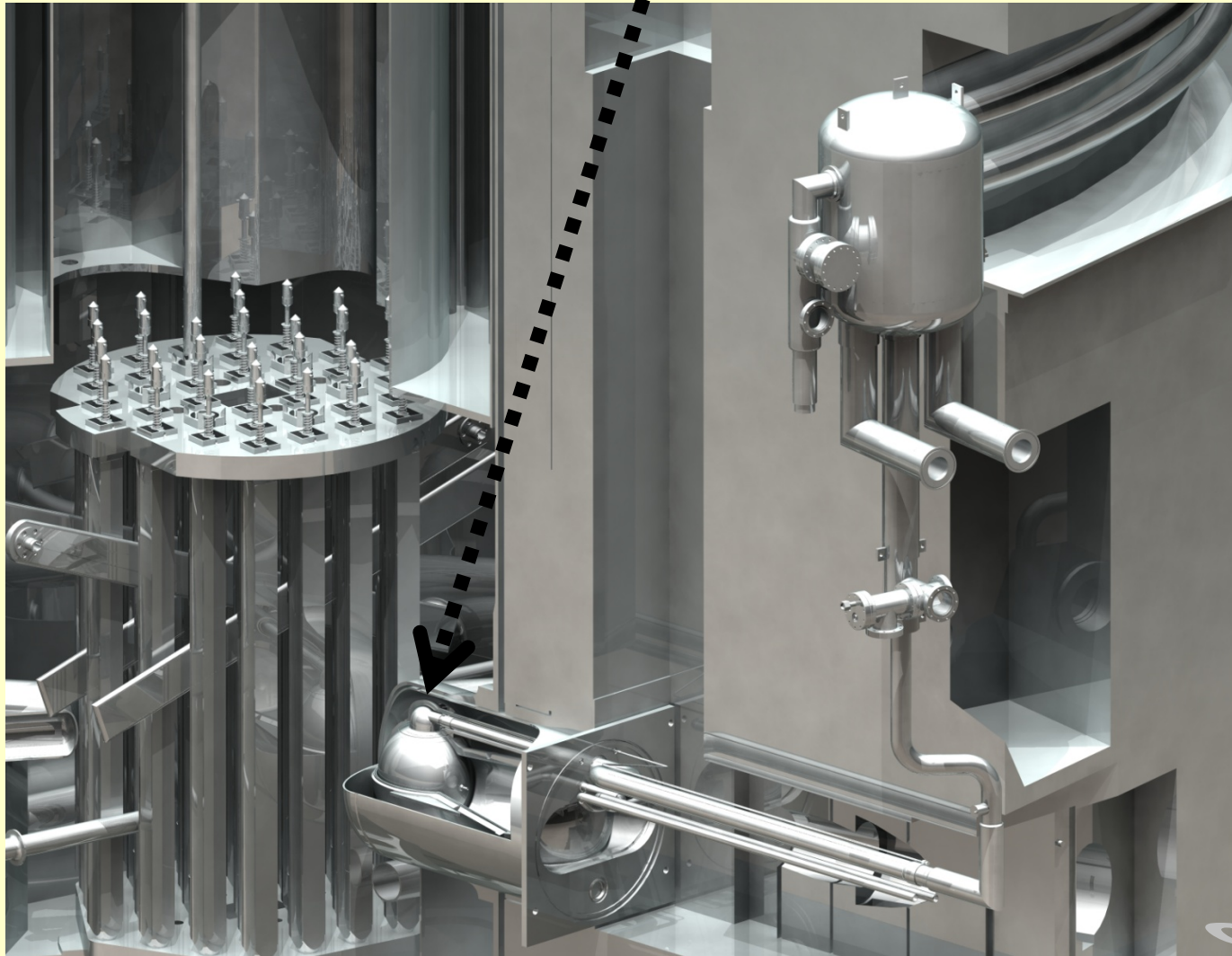
What is a Research Reactor?

- **U-235 fission produces neutrons, γ rays, x rays**
- **Smaller than power reactor**
- **Operate at a low temperature ($< 110^\circ$ F)**

Uses

- Research
 - neutron activation analysis
 - neutron radiography
 - neutron scattering
 - spectroscopy
- Training
- Materials testing
- Making radioisotopes for medicine and industry.

Cold source



The setup

