UCRL-PRES-149818-REV-2

Understanding Radiation and Its Effects

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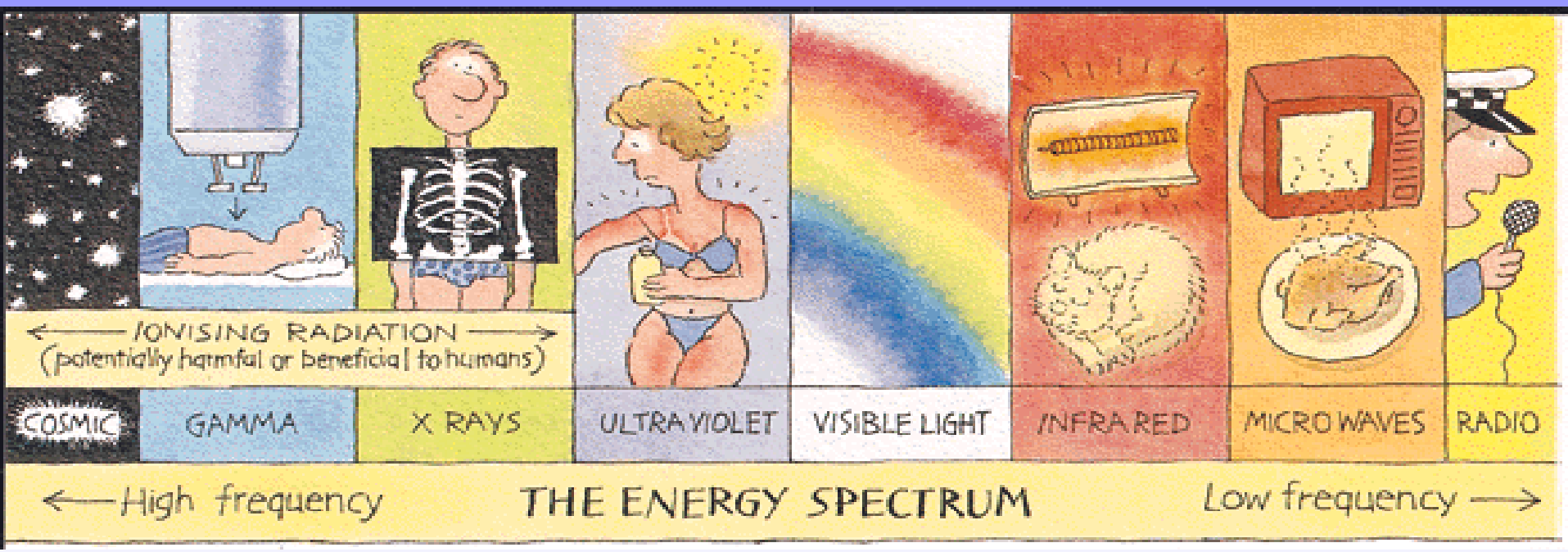
*UCRL-PRES-149818. This work was performed under the auspices of the U.S. Department of Energy by the University of California, Lawrence Livermore National Laboratory under Contract No. W-7405-Eng-48.

Radiation is Energy

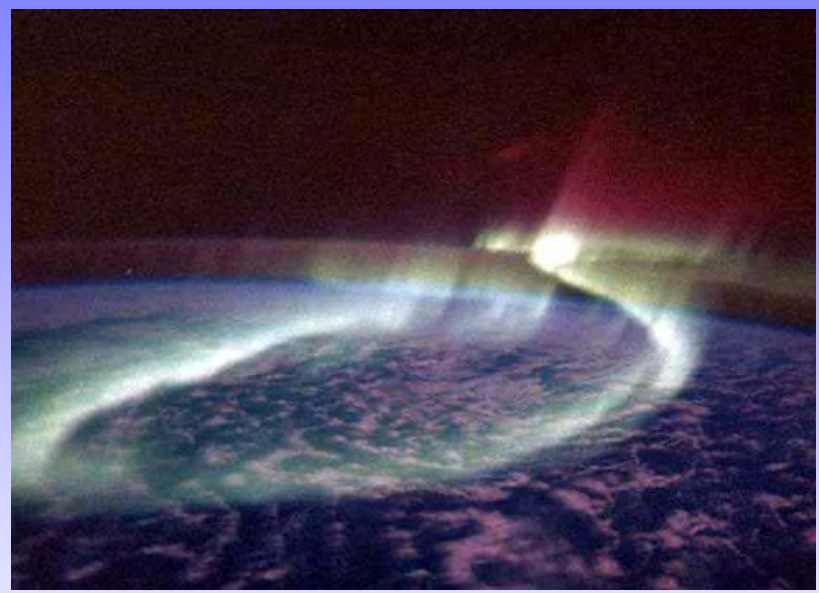
- The energy is given off by unstable (radioactive) atoms and some machines.



- For this talk, we will be focusing on ionizing radiation and its health effects.

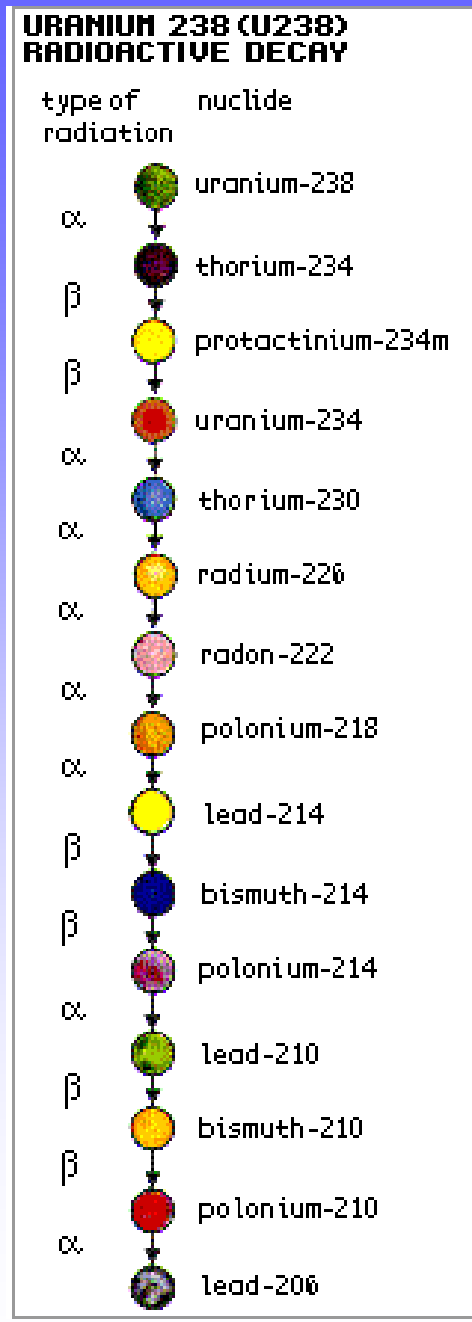
Radiation and Radioactive Material are a Natural Part of Our Lives

- We are constantly exposed to low levels of radiation from outer space, earth, and the healing arts.
- Low levels of naturally occurring radioactive material are in our environment, the food we eat, and in many consumer products.
- Some consumer products also contain small amounts of man-made radioactive material.



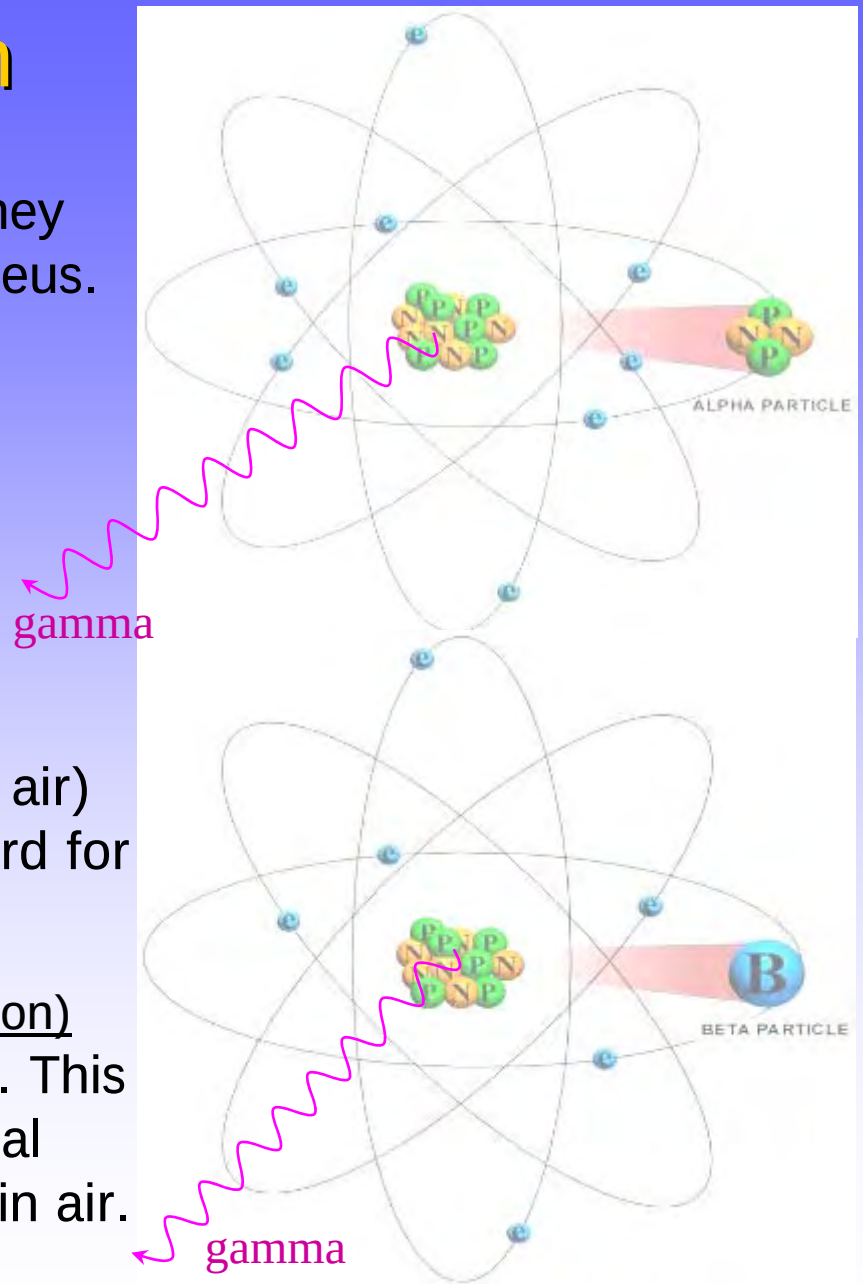
Unstable Atoms Decay

- The number of “decays” that occur per unit time in the radioactive material tell us how radioactive it is.
  - Units include curies (Ci), decays per minute (dpm), and becquerels (decays per second).
- When an unstable atom decays, it ***transforms*** into another atom and releases its excess energy in the form of radiation.
- Sometimes the new atom is also unstable, creating a “decay chain”



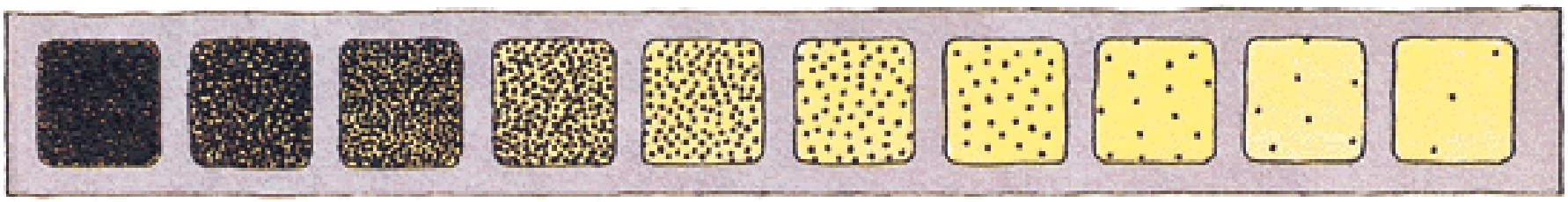
Forms of Radiation

- When unstable atoms transform, they often eject particles from their nucleus. The most common of these are:
  - Alpha Radiation
    High energy, but **short range** (travels an inch in air, not an external hazard)
  - Beta Radiation
    Longer range (10 – 20 feet in air) and can be a skin and eye hazard for high activity beta sources.
- Gamma Rays (electromagnetic radiation)
  Often accompany particle radiation. This "penetrating" radiation is an external hazard and can travel 100s of feet in air.



How Unstable Is It?

Decay rate of radioactivity: After ten half lives, the level of radiation is reduced to one thousandth



Time: One half life two three four five six seven eight nine