NMR SPECTROSCOPY SAFETY

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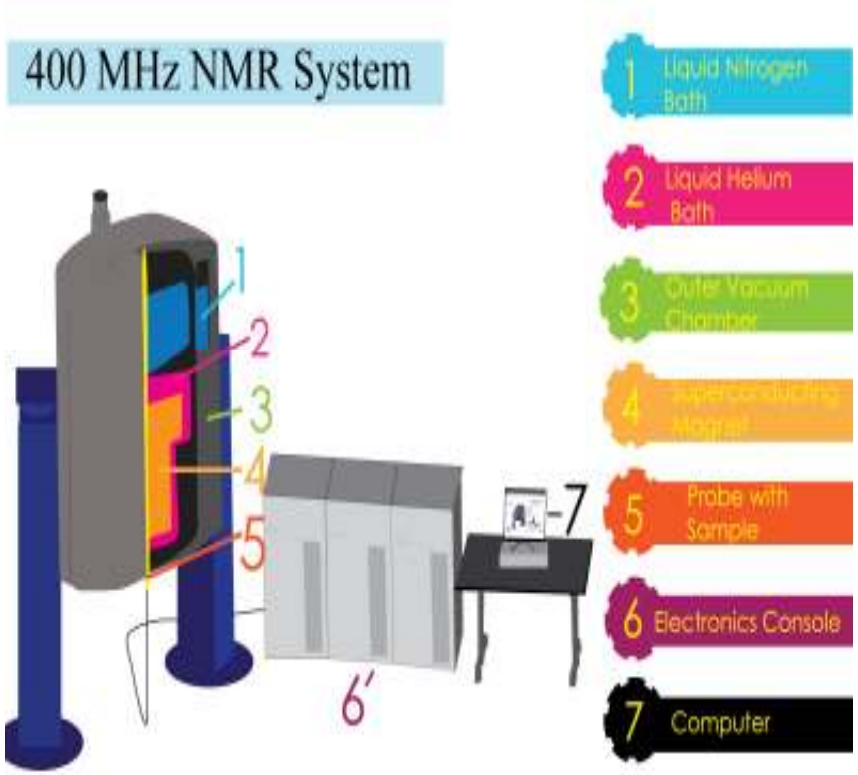
Background

The nuclear magnetic resonance machine (NMR) was co-discovered in the mid 1940's by Purcell, Pound and Torrey of Harvard University and Bloch, Hansen and Packard of Stanford University. The NMR machine is primarily used to determine the structure of various organic compounds. The machine allows interaction between radiation and matter as a function of wavelength. A pulse of radiation is shot through the sample. The nuclei of the sample then absorb this radiation's energy, and finally they emit a signal depending on the energy absorbed. These signals produce carbon spectra ^{13}(CNMR) and hydrogen spectra ^{1}(HNMR).

Safety

- The radiation used is nine orders of magnitude smaller than the frequencies corresponding to x- or γ-rays. The radiation stretches from AM to FM frequencies that is considered biologically safe.
- Before approaching the machine remove metal. The metal rule applies to phones and credit cards and anything magnetic.
- Individuals with pacemakers/medical implants are not permitted in the NMR laboratory.



NMR Maintenance

Maintenance is key to obtaining proper spectra from the NMR spectrometer. The machine contains a superconducting magnet responsible for producing the spectra. To sustain the superconducting field cryogenic liquids are used (liquid nitrogen and liquid helium). The inner coolant is liquid helium with an outer dewar containing liquid nitrogen. The machine is filled with liquid nitrogen once a week. The liquid helium is consistently refilled once every few months. Gloves, safety glasses, and closed shoes must be worn during transfer of the cryogenic liquids.

- Magnetic-resonance.org

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