Heat Flow Analogy

- Irradiation with RF “Heats Up” a Proton Above Room Temperature
    - This Excess Heat Flows to the Environment Continuously as the Proton is Irradiated
    - A Small Amount of This Heat Flows to the Nearby Protons, Slightly Raising Their Temperature Above Room Temperature
    - A Steady-State is Reached When Heat Flowing into Each Proton Equals Heat Flowing Out
    - A Spectrum is Recorded to “Read Out” the Temperature of Each Proton
- The Analogy Breaks Down Because “Heat Flow” (the NOE) Actually Cools Down Nearby Protons
    - Hot Protons Give Weaker Peaks in the NMR
    - The Hottest Ones (Directly Irradiated) Give No Peak at All
    - Protons Cooler Than Room Temperature Give Enhanced Peak Intensity