Laser Fact Sheet

General Info - The Basics

- Light Amplification by the Stimulated Emission of Radiation
- Atoms in the gain medium are excited by a source, photons are released by stimulated emission
- Photons released excite other atoms, which release photons that are 'in step' with the original photon
- Photons reflect and are collimated while exciting other atoms, and are released in a narrow, coherent, collimated beam
- Ruby laser – first laser, built in 1960
- Types – solid state, organic dye, gas, exciplex

Applications

- CD players use a laser create a binary output that can be used in Audio/Video and software.
- Astronomical Interferometery can be used to combine multiple telescope images.
- Laser printers use lasers and static electricity to transfer toner onto paper.
- Lasers have many medical uses such as eye surgery.

Theoretical Applications

- The laser lab here at UR is a leading facility for research in inertial confinement fusion.
- Fusion has a higher energy-to-mass ratio than fission, and it does not result in dangerous spent fuel rods.
- The deuterium and tritium fuel are not renewable resources, but they are essentially infinite!
- Counter to common thought, lasers can also be used to cool matter to temperatures near absolute zero.

- There are a number of factors that limit this effect, such as the complexity of the matter, and the concentration.
- A vacuum is required for an ‘optical trap’ to function properly.