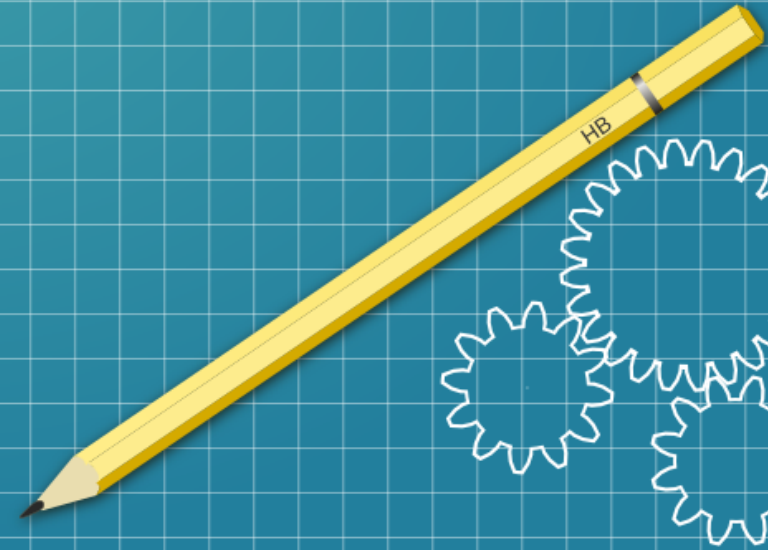
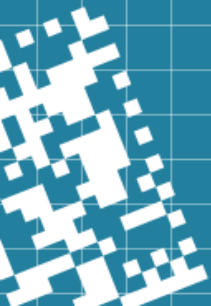
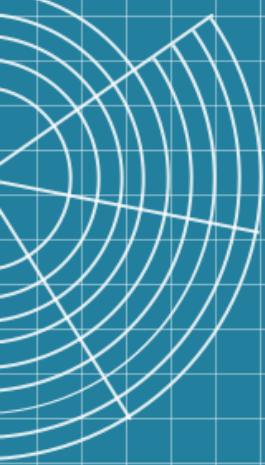


Applications of Lasers

Dr. Niranjana, RVCE



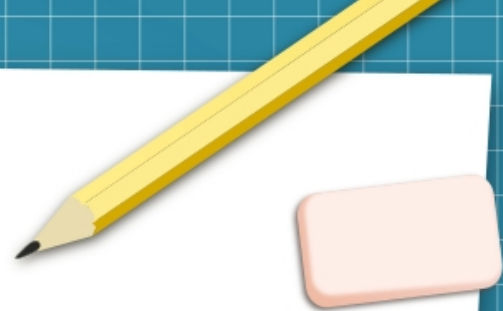
Barcode scanner

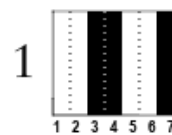


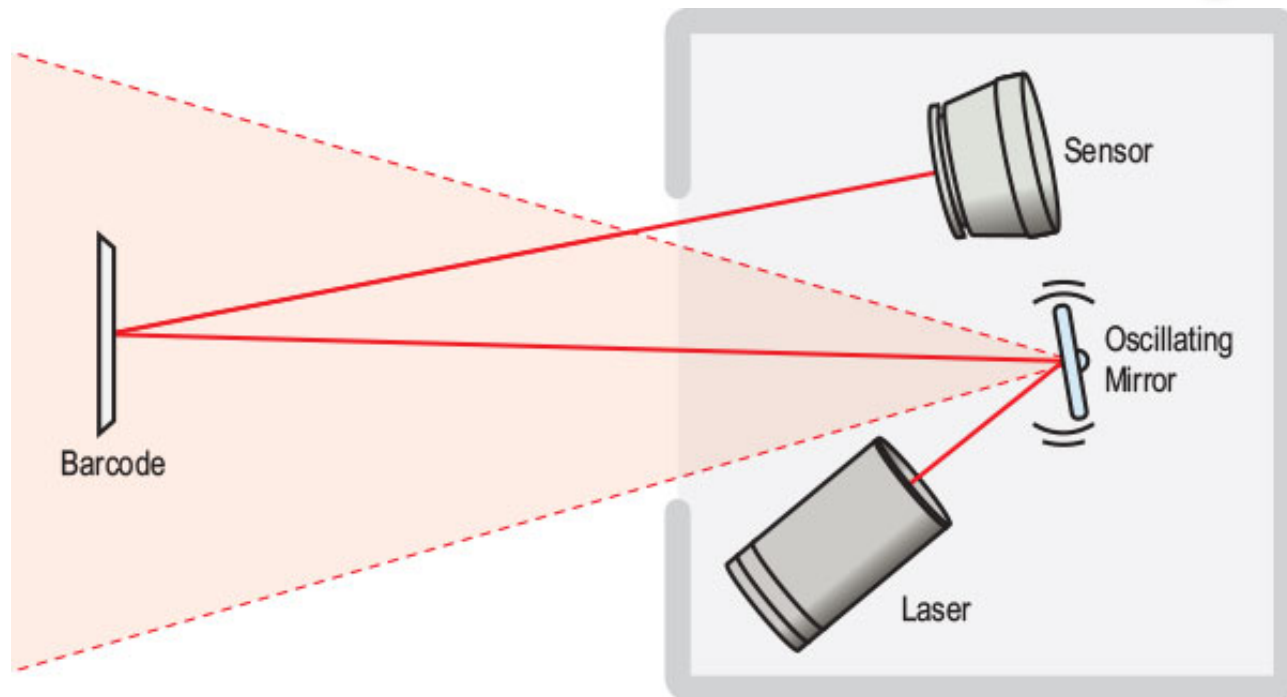


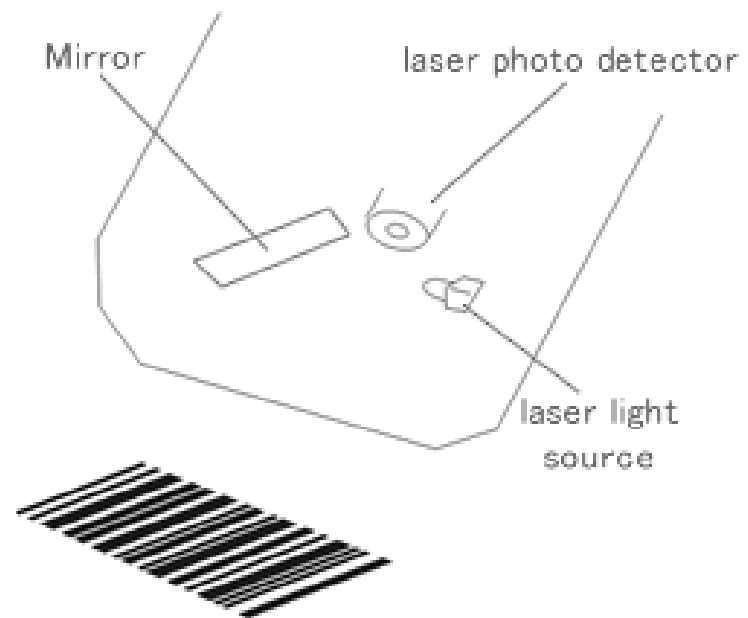


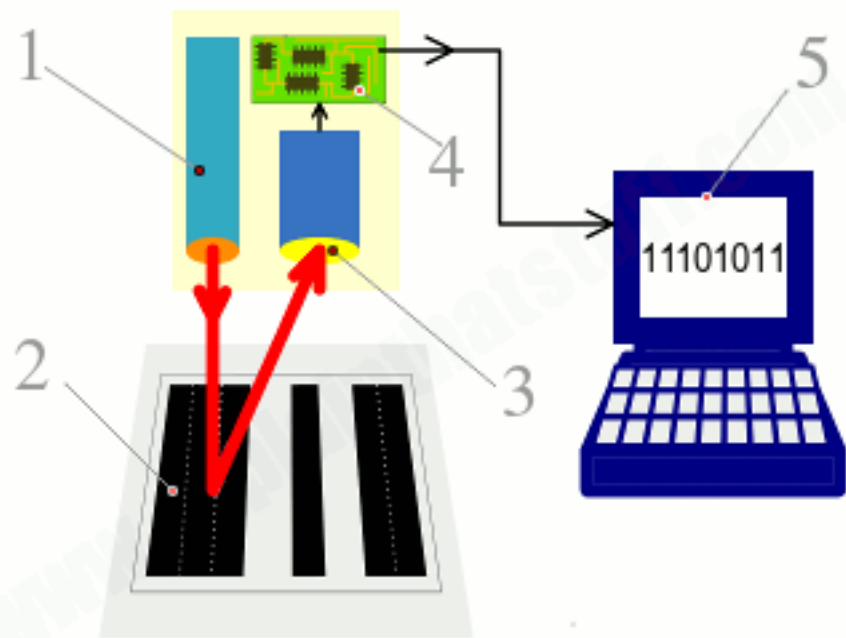






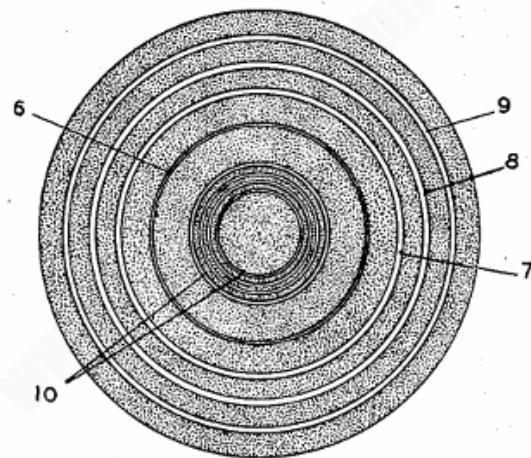






Oct. 7, 1952
2,612,994

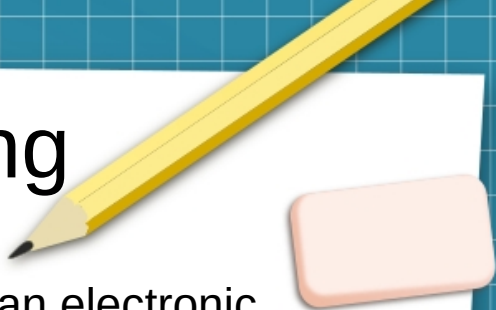
N. J. WOODLAND ET AL
CLASSIFYING APPARATUS AND METHOD



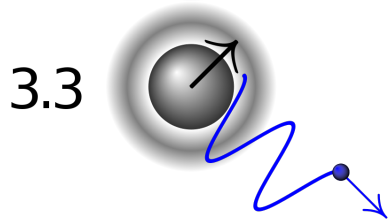
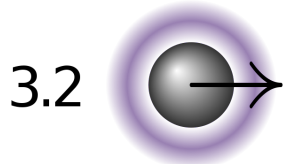
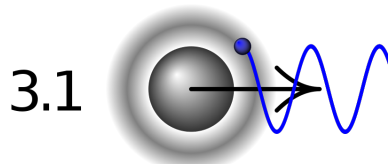
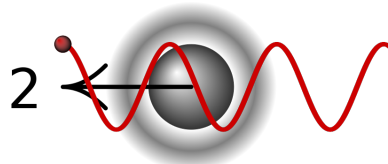
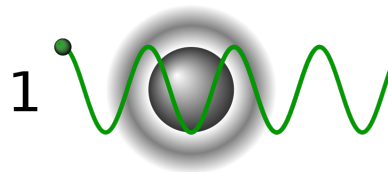
Courtesy US Patent & Trademark Office

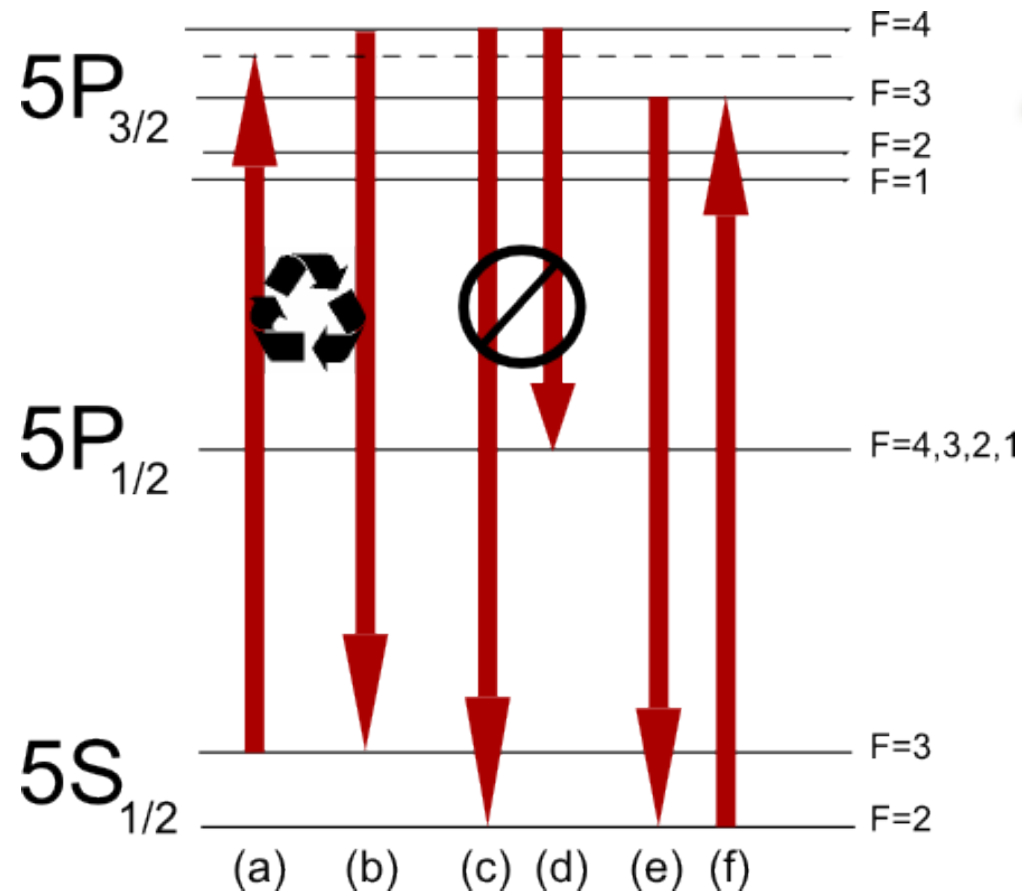
www.explainthatstuff.com

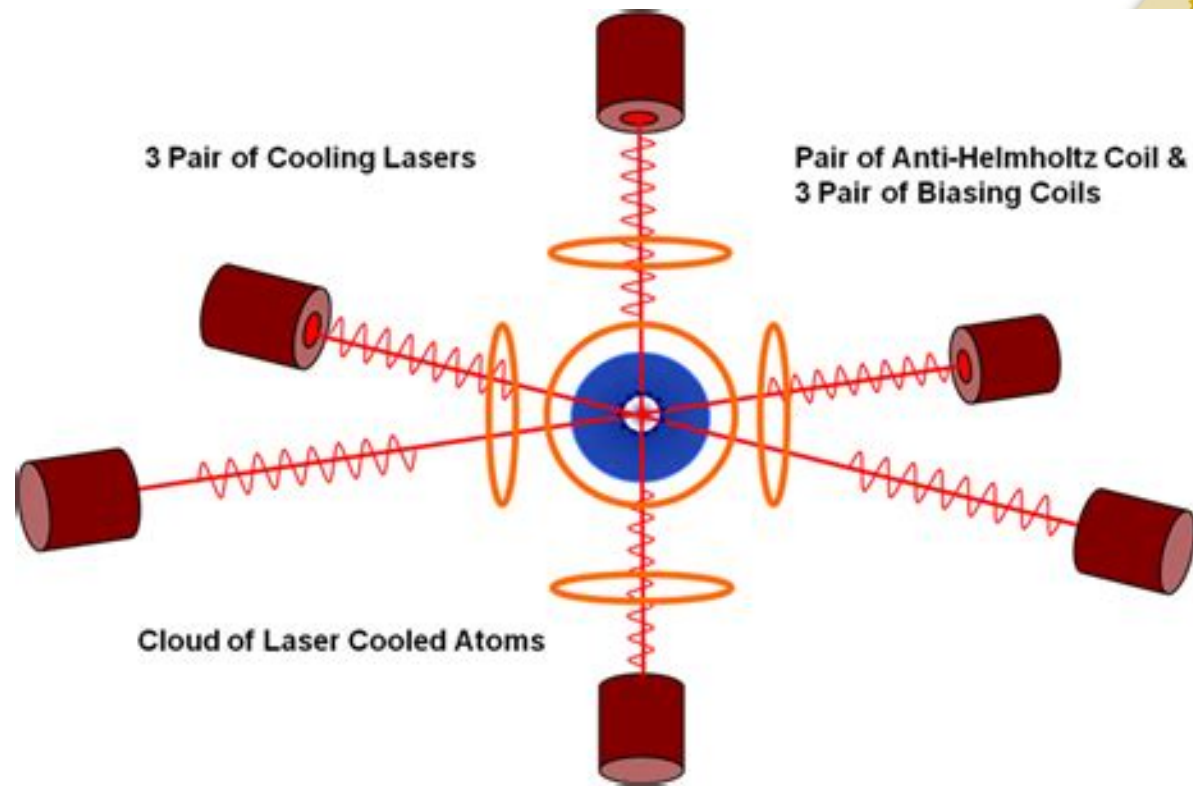
Laser Cooling - Doppler cooling

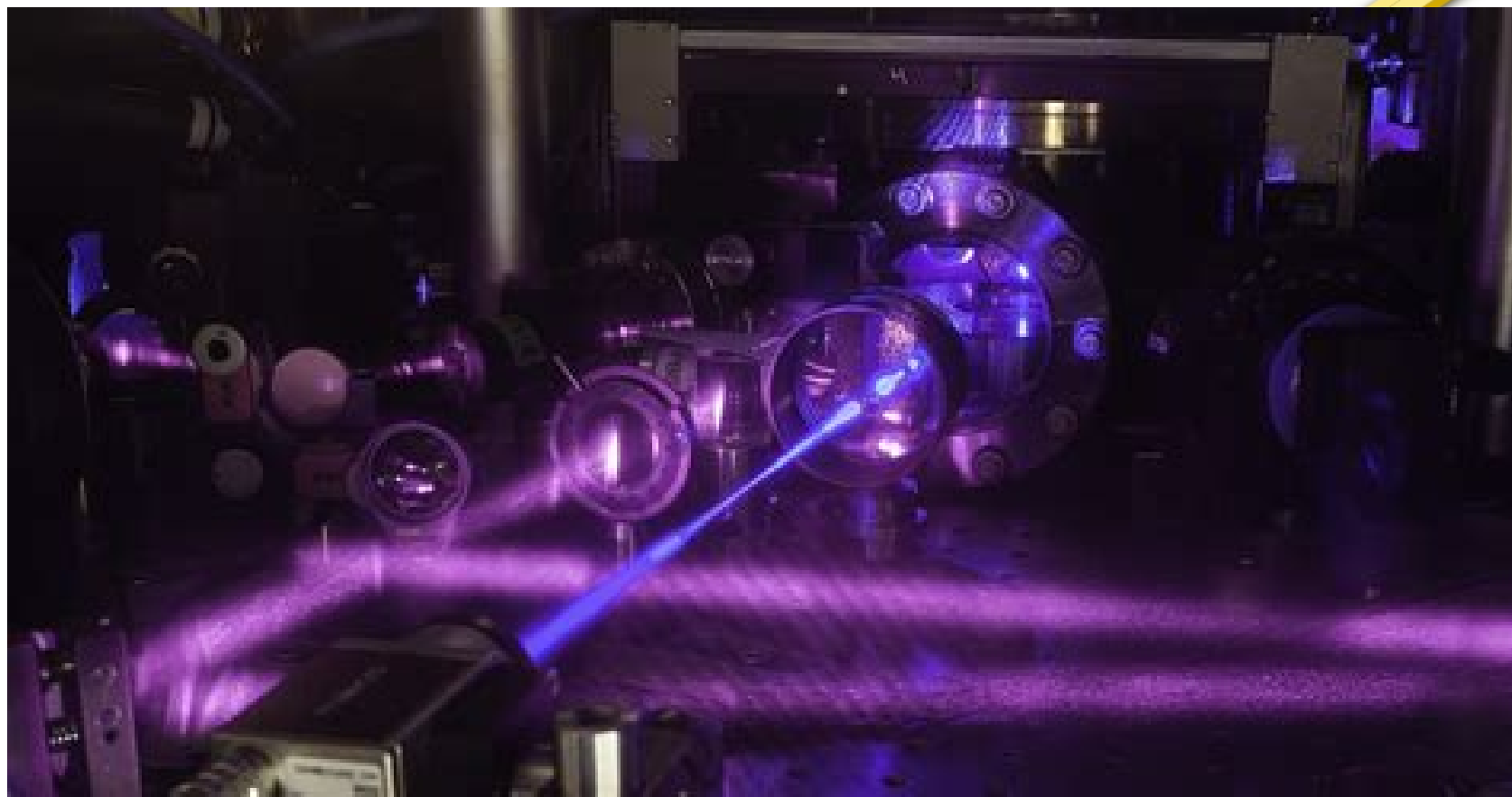


In Doppler cooling, initially, the frequency of light is tuned slightly below an electronic transition in the atom. Because the light is detuned to the "red" (i.e., at lower frequency) of the transition, the atoms will absorb more photons if they move towards the light source, due to the Doppler effect. Thus if one applies light from two opposite directions, the atoms will always scatter more photons from the laser beam pointing opposite to their direction of motion. In each scattering event the atom loses a momentum equal to the momentum of the photon. If the atom, which is now in the excited state, then emits a photon spontaneously, it will be kicked by the same amount of momentum, but in a random direction. Since the initial momentum change is a pure loss (opposing the direction of motion), while the subsequent change is random, the probable result of the absorption and emission process is to reduce the momentum of the atom, and therefore its speed—provided its initial speed was larger than the recoil speed from scattering a single photon. If the absorption and emission are repeated many times, the average speed, and therefore the kinetic energy of the atom, will be reduced. Since the temperature of a group of atoms is a measure of the average random internal kinetic energy, this is equivalent to cooling the atoms.

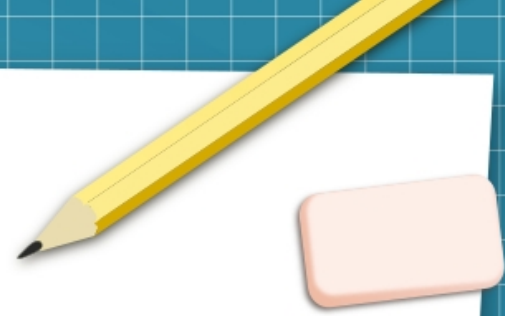






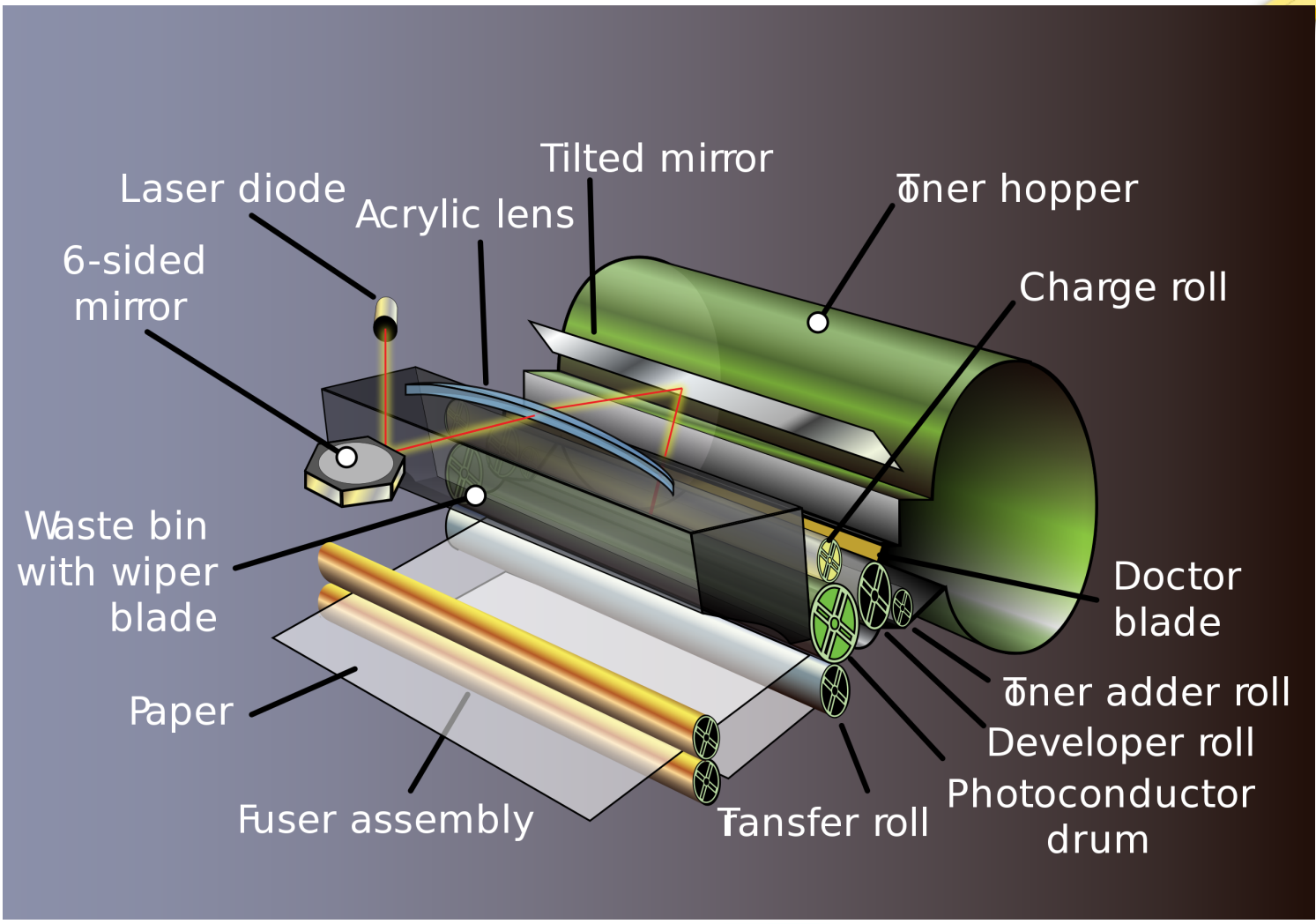


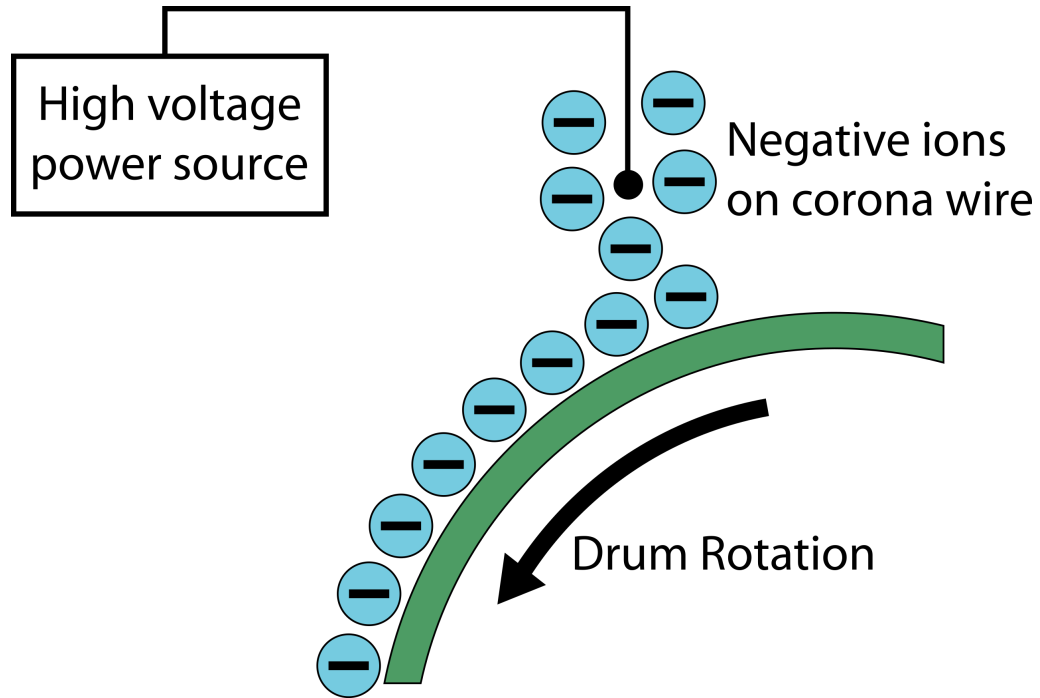
Laser Printer



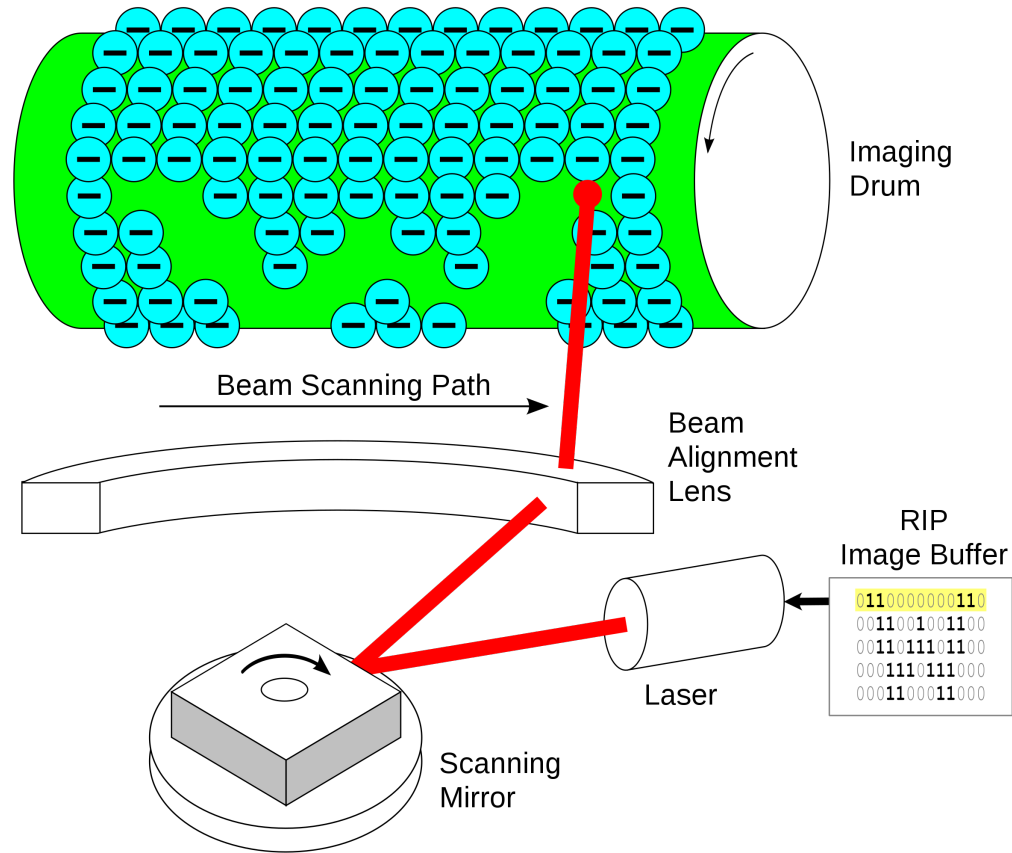
Printing process

- Raster image processing
- Charging – by corona discharge
- Exposing the laser
- Developing with toner
- Transferring
- Fusing

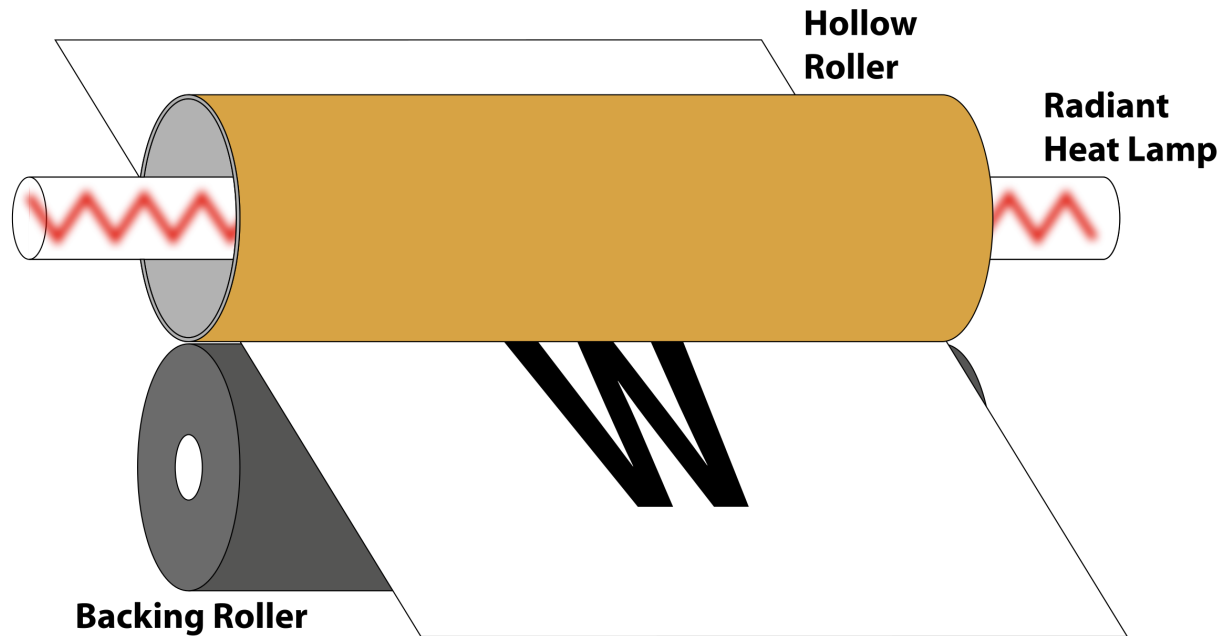




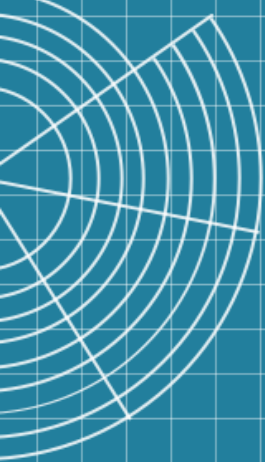
Applying a negative charge to the photosensitive drum



Laser light selectively neutralizes the negative charge on the photoreceptive drum, to form an electrostatic image



Toner is fused onto paper with heat and pressure



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