Materials: laserpointer, mounting material, diffraction grating with known slit-distance,
   CD-Rom (and DVD), cardboard

ATTENTION DANGER!!!!!   Never let the direct beam of a laser hit Your eyes!

Purpose:
- We will determine the wavelength of the red laser-light, emitted by a common laser-pointer
- If we know the wavelength we can measure the distance of two neighbouring tracks on a CD. Moreover we can estimate the memory of a CD-Rom (in Megabytes)

Procedure:
- Determine the wavelength of the the red laser-light of a common laser pointer by using a **diffraction grating** with known slit-distance. Install the grating and the laser-pointer in a stable position. Your screen can be a white sheet of paper fixed on the wall. Mark the positions of visible maxima on this paper and enclose this paper to your protocol as a document. Calculate the percentage error (ask for the precise value of wavelength λ)

- A **CD-Rom** acts like a reflecting grating. The tracks are seperated by distance "g" , see FIG 1. Use a screen made of white paper (radius about 30cm) with a little hole in the middle, so that the laser beam can pass through the hole and hit the CD's surface. Install the screen and the CD parallel zu eachother; the laser-beam should be perpendicular to CD and screen ; see FIG 2). The distance L should be about 20cm. Mark the position of Maxima1 (-1 and +1) and also Maxima 2 (-2 and +2).
- Calculate the distance "g" of two neighbouring tracks.
- Also calculate the number of tracks per millimeter

FIG.1

FIG.2
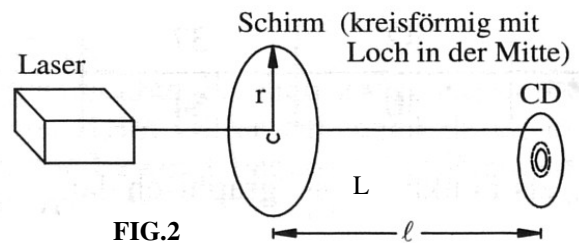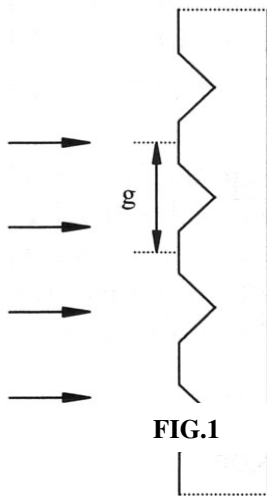
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he data information, stored on a CD is digital, that means, it consists of just 2 values, lets say 0 and 1. These two values are represented by little holes (so called "pits") burned into the reflecting surface, see FIG3.
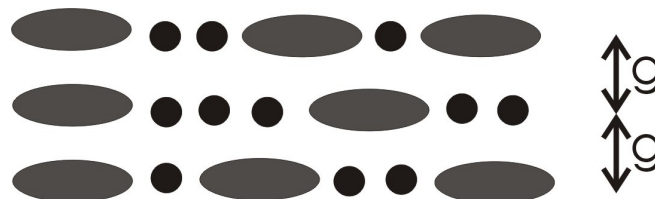

FIG.3
Pits in 3 tracks

"g" is the lowest possible distance, so that the laser-beam of the CD player can read the tracks. It is reasonable to presume that the distance of two pits has about the same value like the distance of the tracks distance.
- With this assumption calculate the approximate memory (in MB) of a CD-ROM.
- Additional (if you have time) ….. beside the CD we know also the DVD which has a bigger storage capacity. What is the distance "g" in a DVD ?