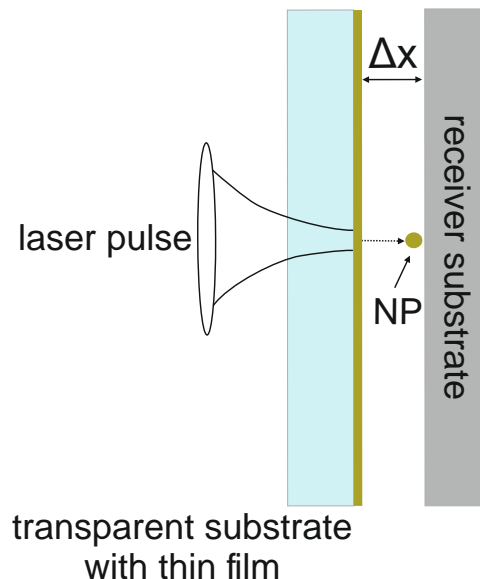




## National Student Team Contest (first stage) Task 1. Laser transfer of nanoparticles

One of relatively new methods of nanoparticles (NP) synthesis is so called laser transfer. The method implies an irradiation of thin film of a given material by femtosecond laser pulses, which results in local heating and melting of the film followed by the single nanoparticles formation. The irradiation of the film from the transparent substrate side makes it possible to transfer the nanoparticles onto the receiver substrate, which is placed within certain distance  $\Delta x$  from the film surface.

What maximum distance between the film and the receiver substrate may be overpassed by the spherical gold NP with the diameter of 400 nm in water, if it is known that this value for twice smaller nanoparticle in air is equal to 250 nm? Suppose that initial velocities of nanoparticles in air and in water are equal, and that there is a medium resistance which is proportional to their velocities and radius, while proportionality coefficients ratio in water and in air is 50:1. **(6 points)**



**Total – 6 points**