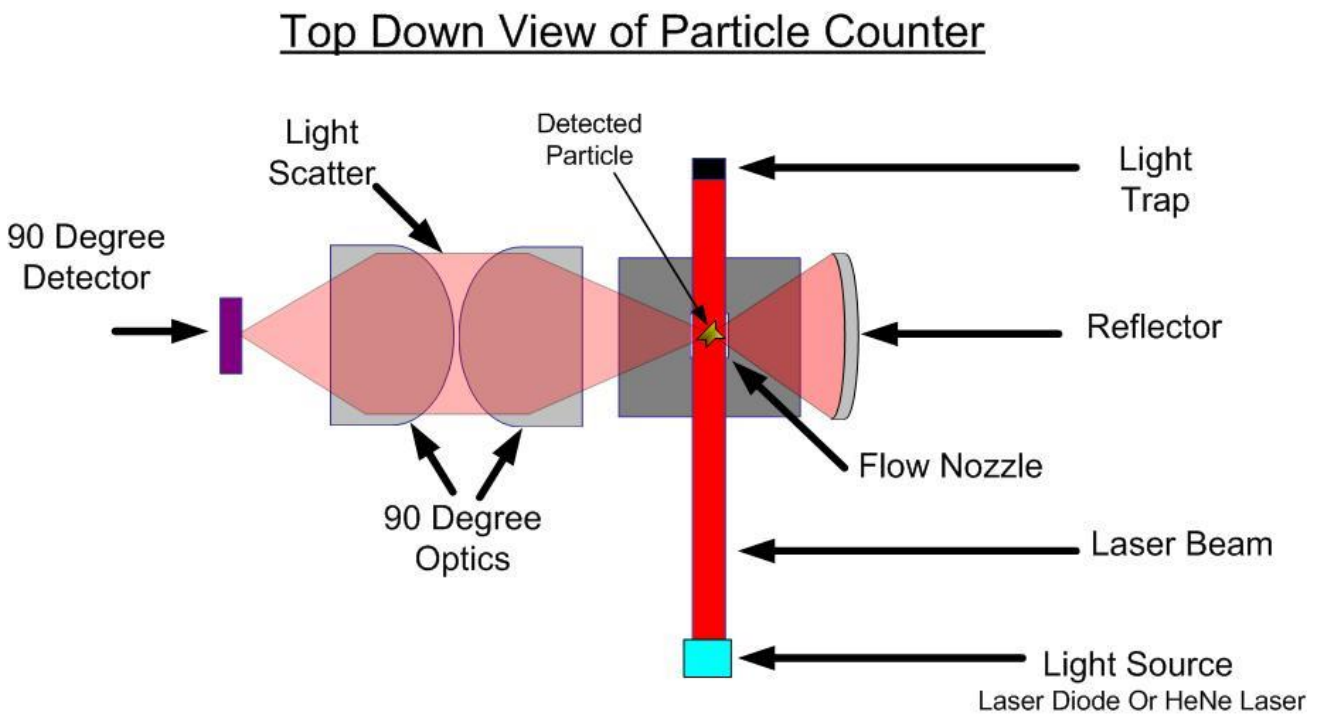
PARTICLE COUNTER

(Instrumental technique)

P. Srikrishnarka

TYPES:

1. Aerosol particle counter
2. Liquid particle counter
3. Solid particle counter



PRINCIPLE:

1. Light scattering
2. Light obscuration
3. Direct imaging

https://en.wikipedia.org/wiki/Particle_counter#/media/File:Particlecounter.jpg

WORKING:

1. **The light blocking** optical particle counter method is typically useful for detecting and sizing particles greater than 1 micrometer in size and is based upon the amount of light a particle blocks when passing through the detection area of the particle counter. This type of technique allows high resolution and reliable measurement.

2. **The light scattering** method is capable of detecting smaller-sized particles. This technique is based upon the amount of light that is deflected by a particle passing through the detection area of the particle counter. This deflection is called light scattering. Typical detection sensitivity of the light scattering method is 0.05 micrometer or larger. However, employment of the condensation nuclei counter (CNC) technique would allow a higher detection sensitivity in particle sizes down to nanometer range. A typical application is monitoring of ultrapure water in semiconductor fabrication facilities.

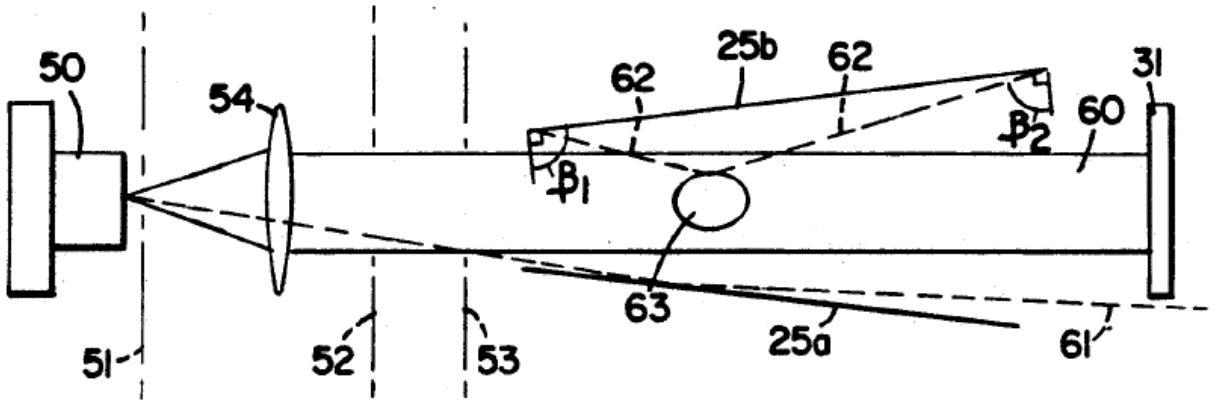
3. **Direct imaging** is a technique that uses the light emitted by a laser as a source to illuminate a cell where particles are passing through. The technique does not measure the light blocked by the particles, but rather measures the area of the particles functioning like an automated microscope. A pulsed laser diode freezes the particle motion. The light transmitted through the fluid is imaged onto an electronic camera with macro focusing optics. The particles in the sample will block the light, and the resulting silhouettes will be imaged onto the digital camera chip.

LASER (50)

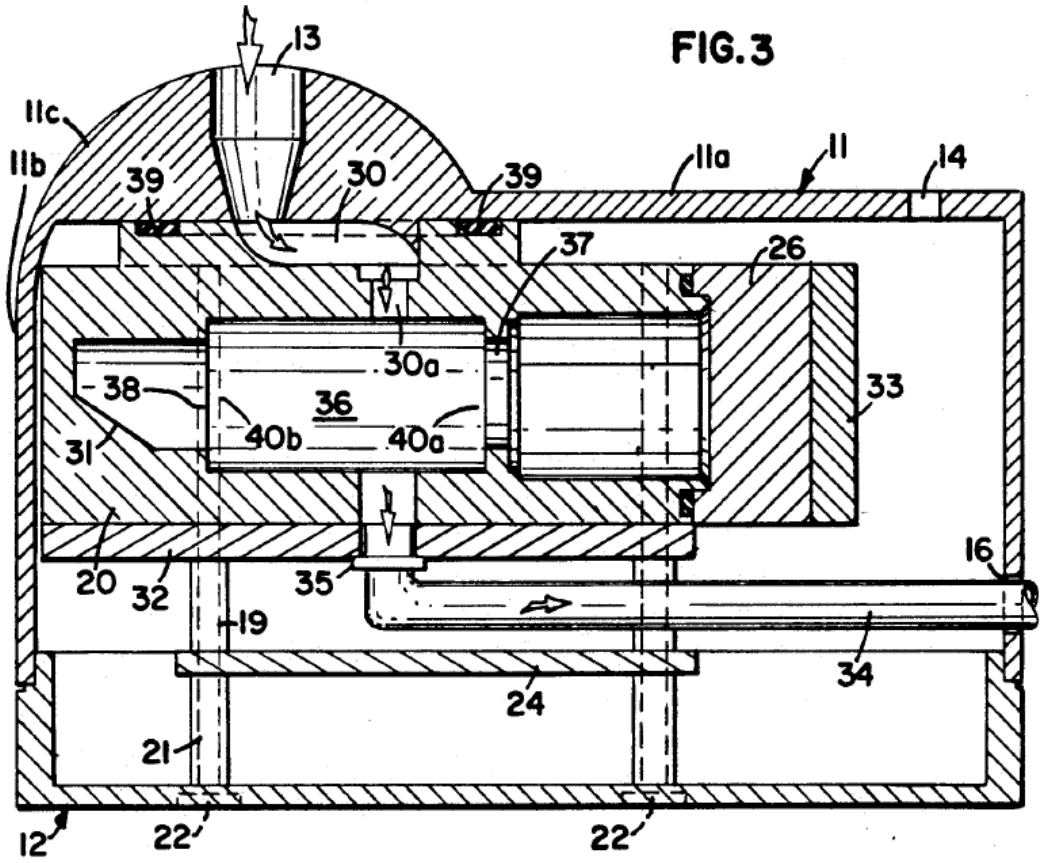
Collimating lens (54)

Detectors (25a and 25b)

LASER beam (60)



Sensing volume (63)



No to be placed in high dust streams

Sensitive towards humidity temperature and towards organic gases