## Calculations

* 1. **Compute the wavelength of He-Ne laser and its uncertainty**

1. Compute the mirror displacements.

*Δd1*= *d150- d0*, *Δd2*= *d200- d50, Δd3*= *d250- d100*

1. Compute the averaged mirror displacement.
2. Compute the wavelength of He-Ne laser.
3. Compute relative error of the wavelength of He-Ne laser.

(*λ*0=633.0 nm)

1. Compute the type A evaluation of uncertainty in .

1. Compute the type B evaluation of uncertainty in .

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1. Compute the combined uncertainty in .

1. Compute the uncertainty in .

(Δ*m*=3×50)

1. The final result of the laser wavelength.

λ=

* 1. **Compute the wavelength of He-Ne laser and its uncertainty**

1. Compute changes in pressure.

*Δp1*= *p12- p11*, *Δp2*= *p22- p21, Δp3*= *p32- p31*

1. Compute the mean value of the changes in pressure.
2. Compute the index of refraction of air at atmospheric pressure.

(*p*=1.01325×105Pa)

1. Theoretically, the index of refraction of air at atmospheric pressure can be calculated by the following equation

where *p* is atmospheric pressure in Pa, *T* is the room temperature in ℃. Compute the theoretical value of the index of refraction of air.

1. Compute the relative error of *n*.