
Topic Outline

2d. Vacuum Measurement

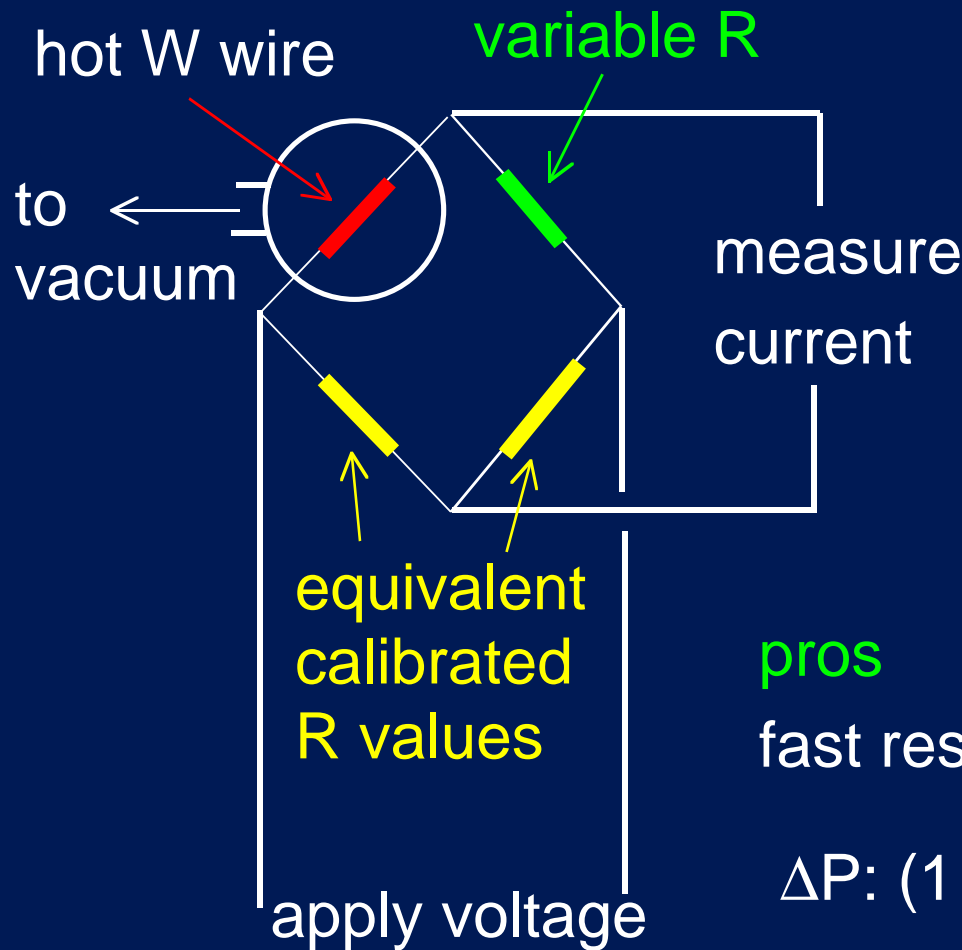
Thermocouple Gauges

Capacitance Gauges

Spinning Ball Rotors

Ion Gauges

Thermocouple Gauges



Operation

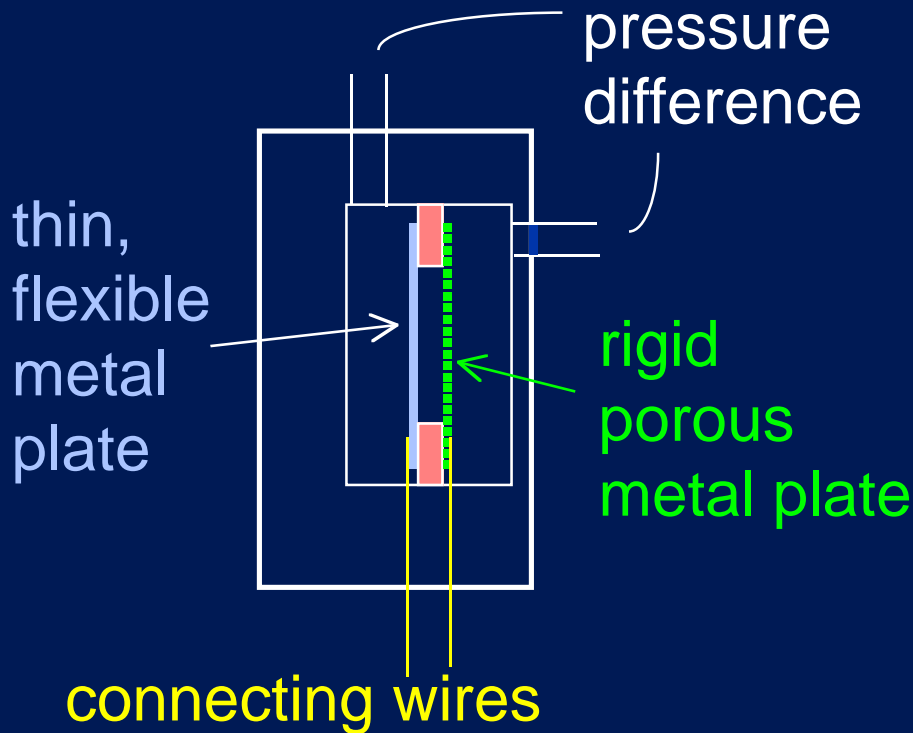
Thermal conductivity of gas varies with P. Vary the voltage on the Wheatstone bridge to maintain a constant R for the W wire.

pros

fast response

ΔP : (1 atm) to 1 mbar

Capacitance Gauges



Operation

The capacitance of the system varies as the separation between the plates changes due to changes in ΔP .

pros

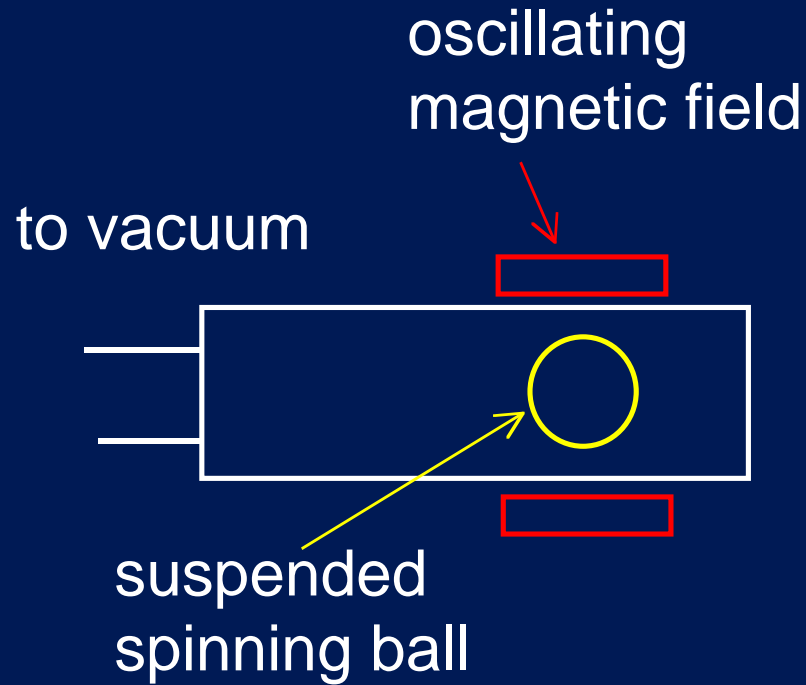
very accurate
(when calibrated)

cons

must be thermally insulated

ΔP : (1 atm) to about
0.001 mbar

Spinning Ball Rotors



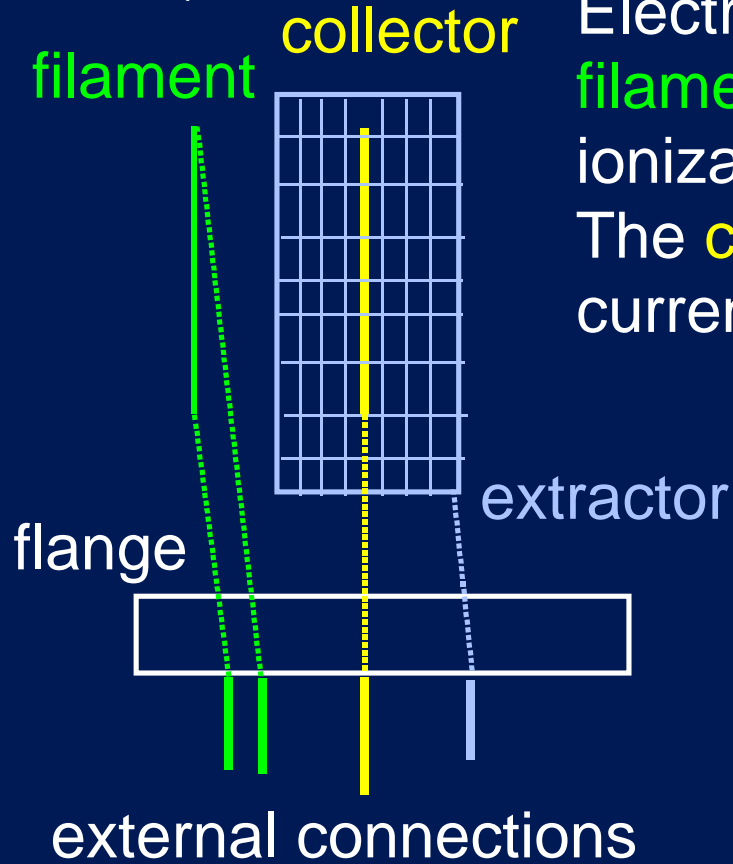
Operation

Gas viscosity depends on P . Measure the energy needed to keep the ball spinning under various P .

pros

highly accurate (when calibrated)

(the components are all electrically insulated from one another)



Ion Gauges

Operation

Electrons are pulled from the filament by the extractor. Gas ionization occurs depending on P. The collector measures the net current.

pros

100 % UHV compatible

cons

not highly accurate (especially at low UHV)

filaments oxidize

ΔP : 10^{-4} to about 10^{-10} mbar