So far, mostly used to study weak absorption in gases. How to measure the weight of the captain? Bulk scattering by gas phase is low. Effective pathway can be very long (kilometers!). Highly reflective mirrors at each end (special coatings) from the Principal of Edinburgh University from 1859 - aged 78!

Could measure weight of ship and compare to weight of captain. Small difference on a big measurement! Not very accurate. Conventional absorption spectroscopy. Compare I against I_0. Sticky for small absorbances. Fluctuations in I. Why Cavity Ringdown Spectroscopy?

1) spatial filter 2) polarising beamsplitter 3) brewster mount 4) photomultiplier detector (PMT)

Experimental setup

Brewster’s angle

How many molecules?

The Ringdown

Malachite Green

Can estimate number of photons in cavity during decay. Depends on properties of the photomultiplier tube.

How many photons?

Summary

measure α at different concentrations
again see evidence for dimers
little change in relative dimer concentration over large range of coating concentrations
small “polarization” shift
complicated by dye sensitivity to pH

measure α for different concentrations
no effect with pH
see a linear region
monolayer / multilayer?
effect of dimers ruled out

Sir David Brewster (1781-1868)

Pioneer in physical optics and renowned maker of scientific instruments.

- attended Edinburgh University from the age of 12, walking 45 miles from Jedburgh to Edinburgh, as was the custom of the day.
- Principal of Edinburgh University from 1859 - aged 78!

The zenith of his formal education was reached at age 19 when he was awarded an honorary master of arts degree. This carried with it a license to preach the gospel as a minister of the Scottish Established Church. Of Brewster’s brief pulpit period, James Hogg, a college friend, wrote in a letter to publisher James F. W.:

... He was licensed, but the first day he mounted the pulpit was the last. ‘Fie! if he had then, if he has not still, a nervous something about him that made him widow when he heard his own voice and saw a congregation moving him; so he slacked his discourse, and vowed never to try that job again. It was a pity for Stirk, the National Church of Scotland...’ But it was a good day for Science... for the doctor later got a salary, he might likely have taken to his toady like other folk.”