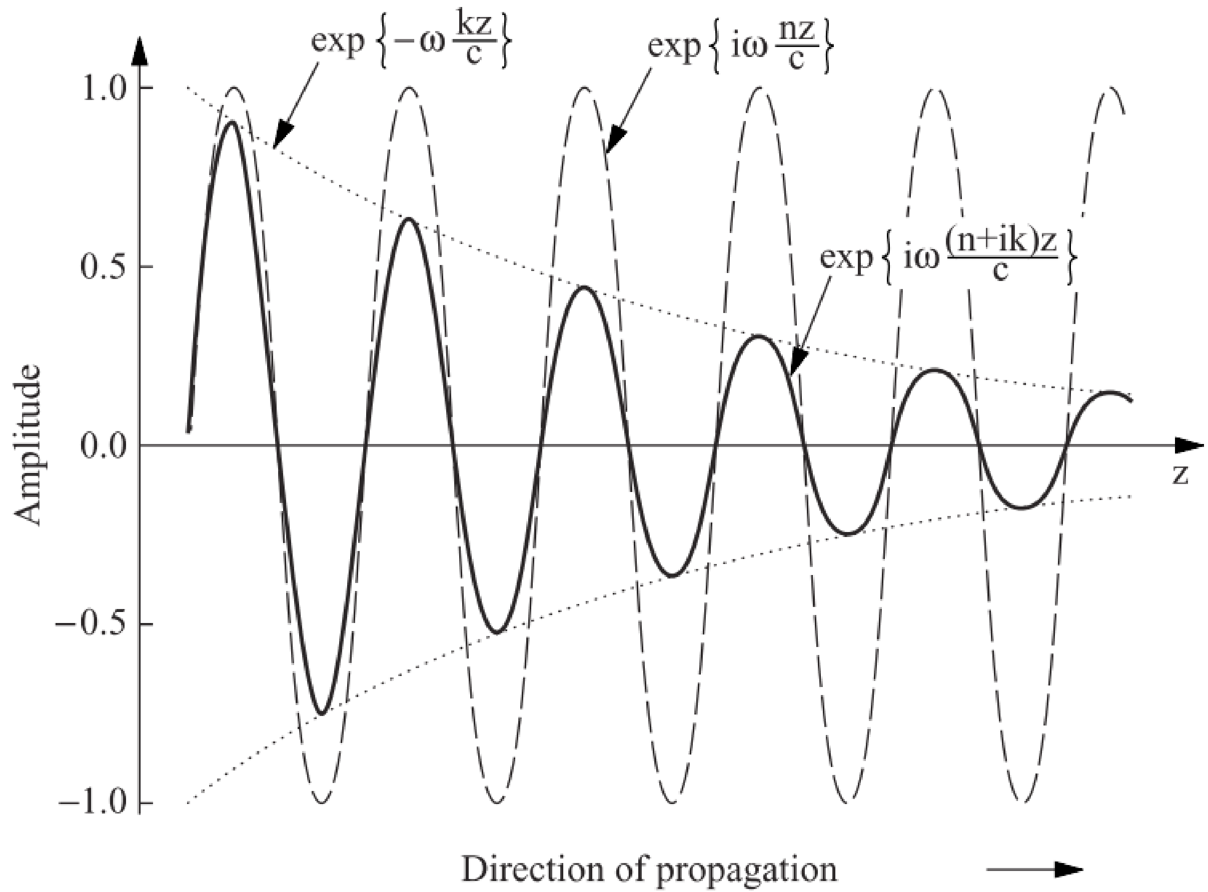
$$\vec{E} = \vec{E}_0 e^{-\frac{k\omega}{c}\vec{n}_q\cdot\vec{r}}\, e^{i\left(\frac{n\omega}{c}\vec{n}_q\cdot\vec{r}-\omega t\right)}$$



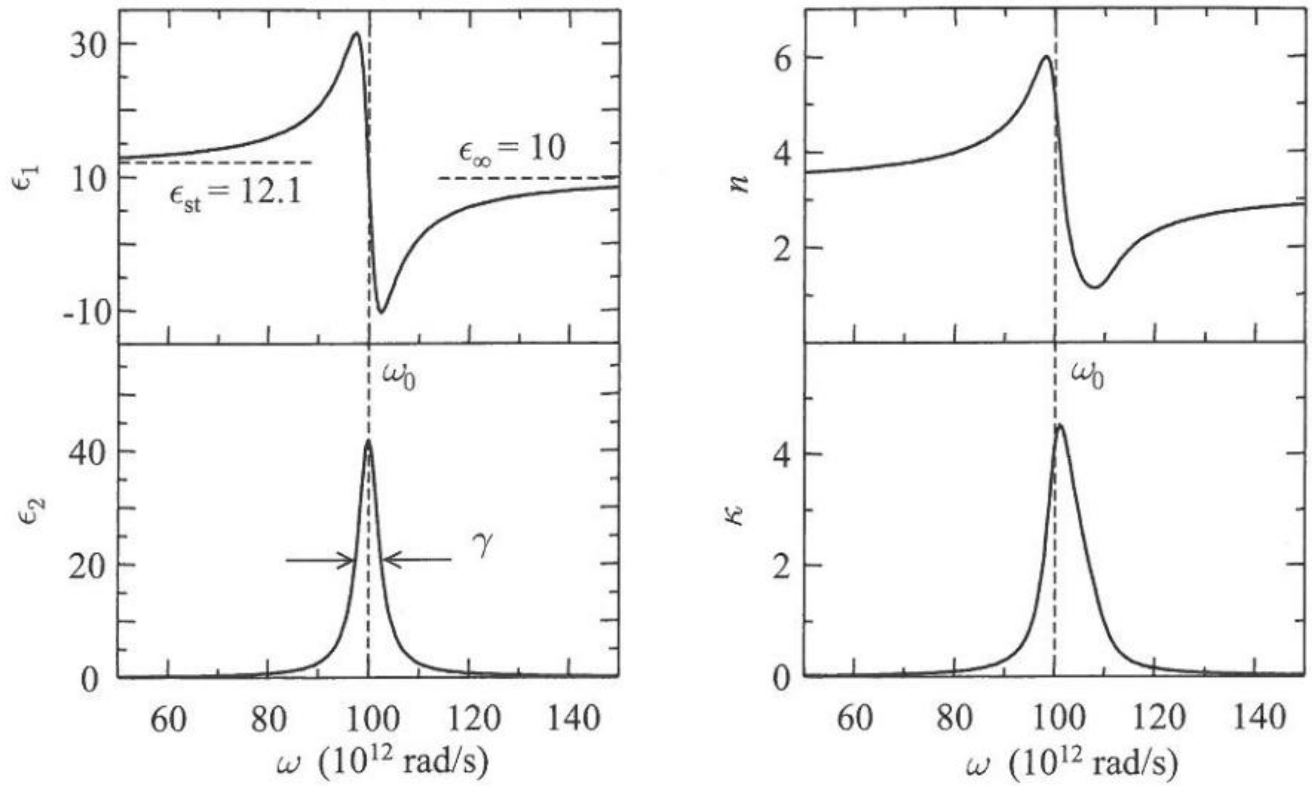
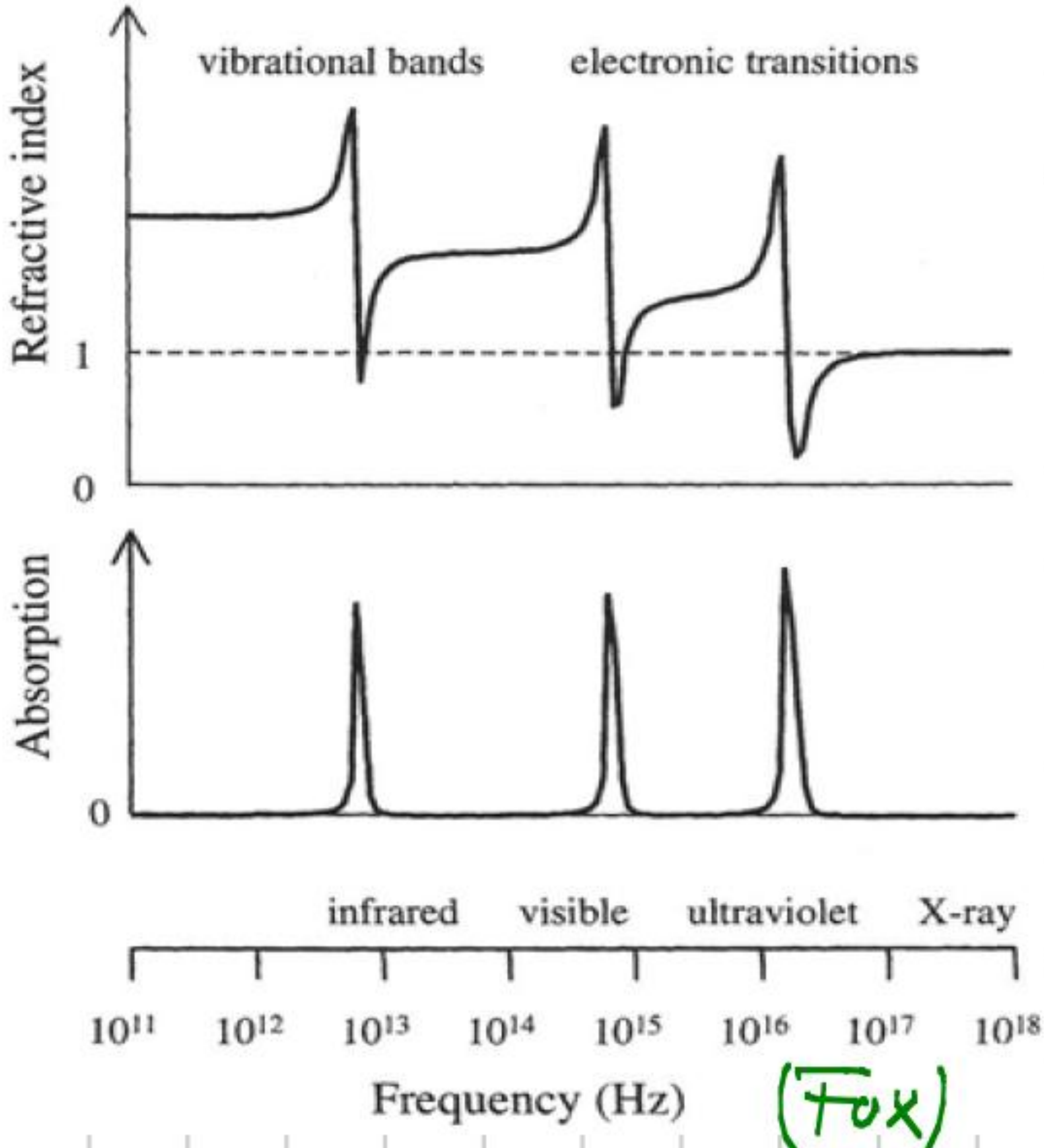
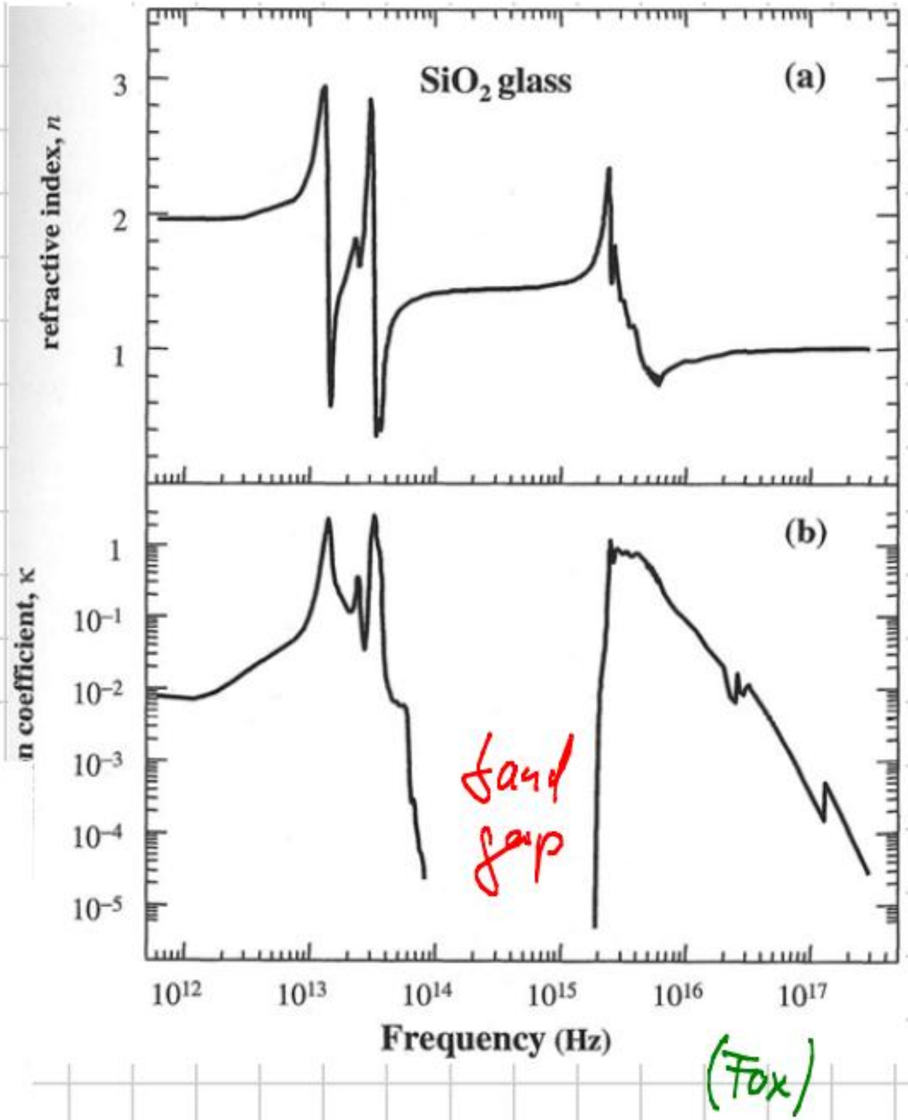


Fig. 2.4 Frequency dependence of the real and imaginary parts of the complex dielectric constant of a dipole oscillator at frequencies close to resonance. The graphs are calculated for an oscillator with $\omega_0 = 10^{14}$ rad/s, $\gamma = 5 \times 10^{12}\,\mathrm{s}^{-1}$, $\epsilon_{st} = 12.1$,(and $\epsilon_\infty = 10$. Also shown is the real and imaginary part of the refractive index calculated from the dielectric constant.


vibrational bands
electronic transitions
Refractive index
1
0
Absorption
0
infrared
visible
ultraviolet
X-ray
10^{11}
10^{12}
10^{13}
10^{14}
10^{15}
10^{16}
10^{17}
10^{18}
Frequency (Hz)
(Fox)


SiO$_2$ glass
(a)
refractive index, n
3
2
1
(b)
n coefficient, κ
1
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
band gap
10^{12}
10^{13}
10^{14}
10^{15}
10^{16}
10^{17}
Frequency (Hz)
(Fox)

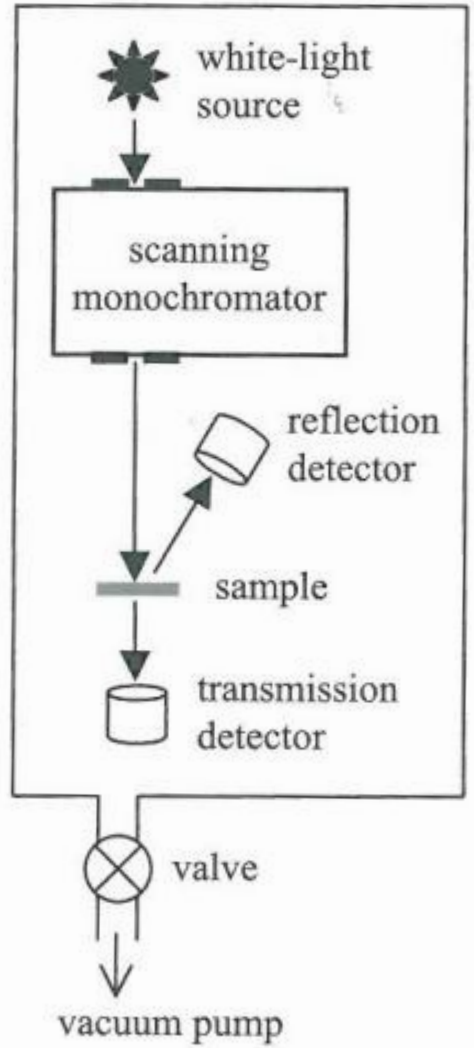
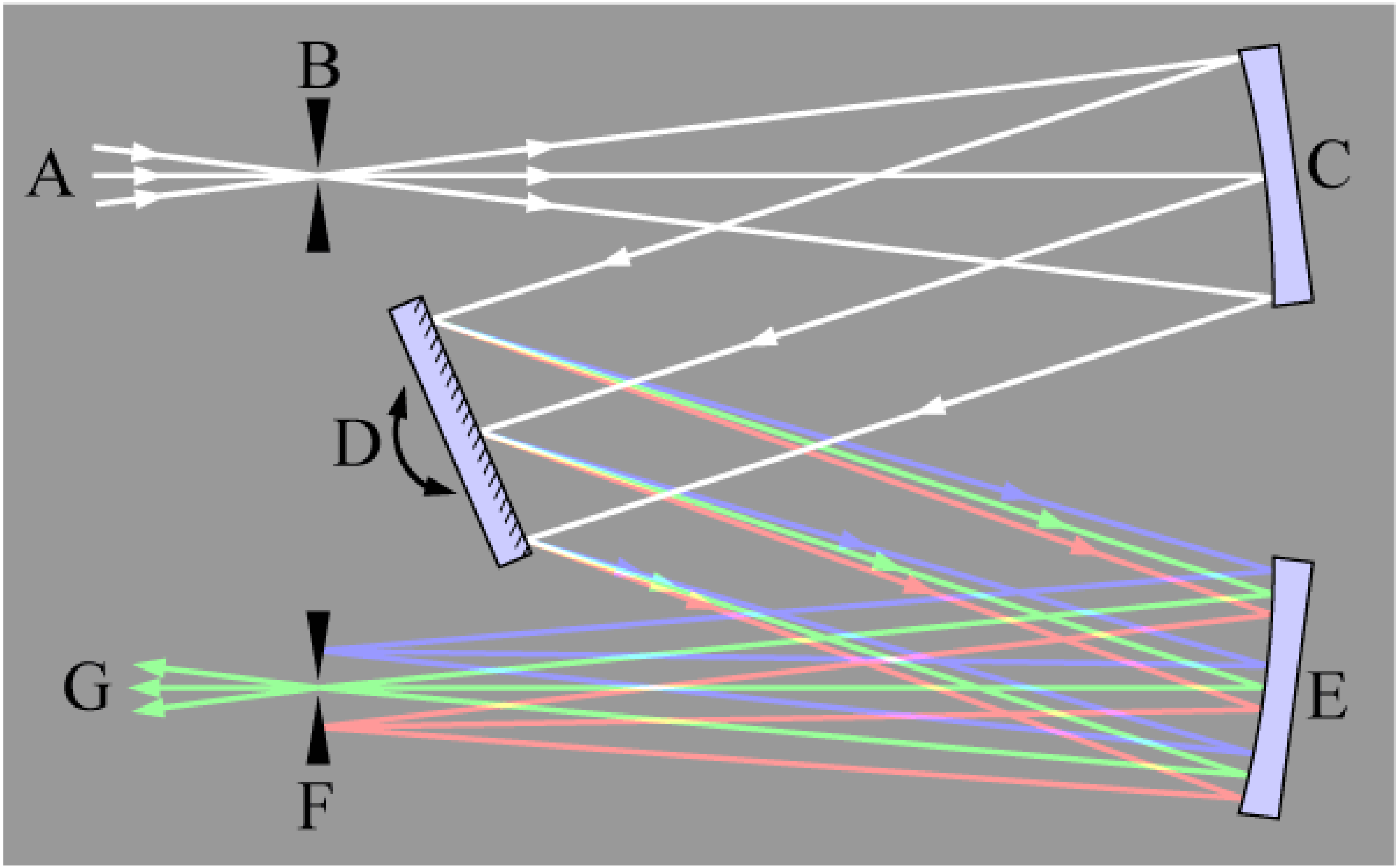


Fig. 3.14 Schematic diagram of the experimental arrangement required to determine the absorption coefficient over a wide spectral range by making reflectivity and transmissivity measurements.

Czerny-Turner monochromator



Spectal region	Wavelength (nm)	Source	detector
Infrared	> 1600	Black body	Cooled semiconductor
Near infrared	700-1600	Black body	Semiconductor
Visible	400-700	Black Body	Photomultiplier
Ultraviolet	200-400	Xenon lamp	Photomultiplier

Photomultiplier

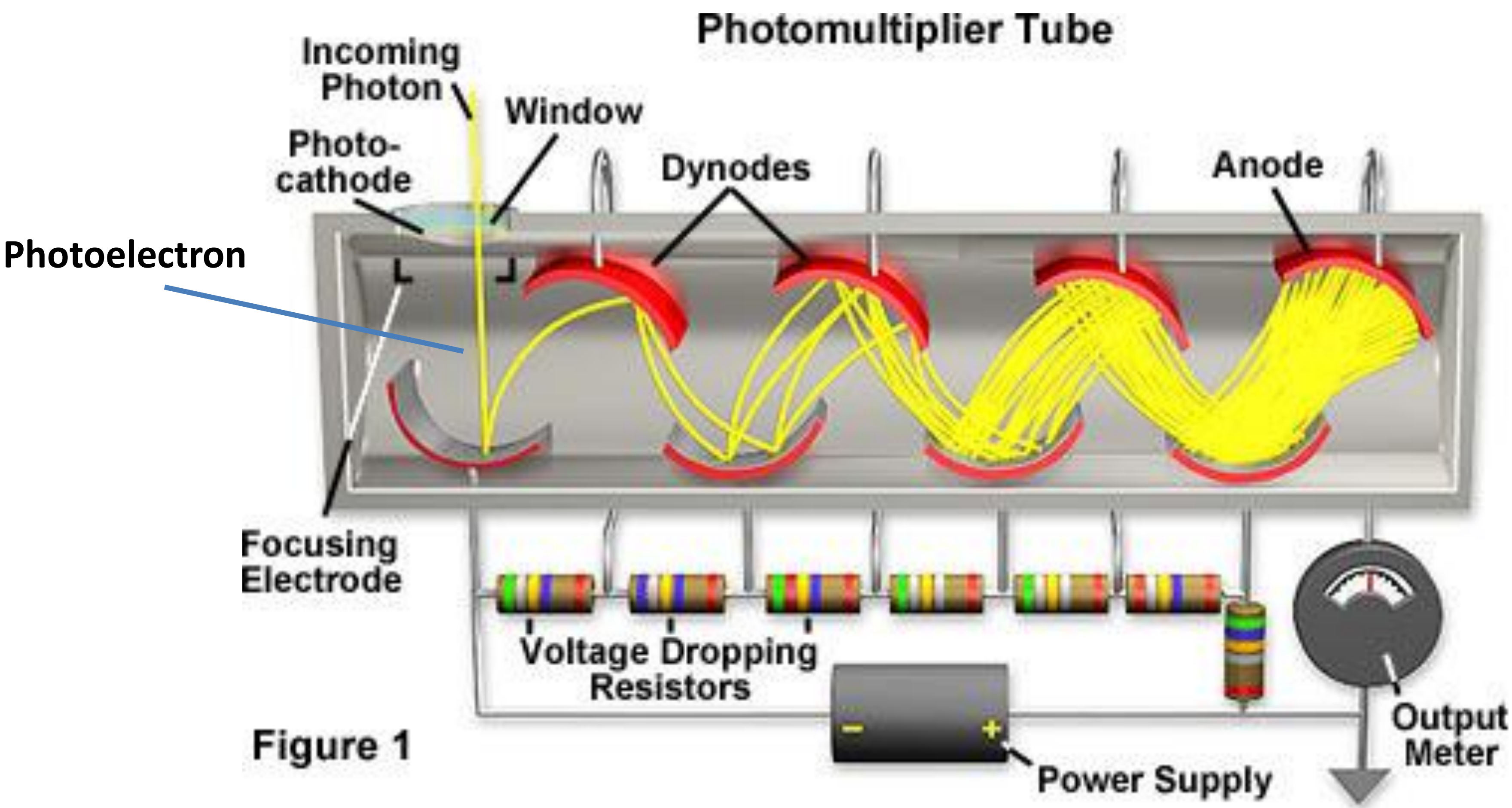


Figure 1

Fourier-transform infrared spectrometer