6.3B: Interferences of Flame Noise

Background signal from the flame is measured at the detector and is indistinguishable from the source power. Flame noise in the form of emission from the flame or changes in the flame background as a sample is introduced can cause a significant interference in atomic methods.

Can you design a feature that could be incorporated into a flame atomic absorption spectrophotometer to account for flame noise?

We can account for flame noise and changes in the flame noise by using a device called a chopper. A chopper is a spinning wheel that alternately lets source light through to the flame and then blocks the source light from reaching the flame. Figure $6.3B.11$ illustrates several chopper designs.

Figure $6.3B.11$. Illustration of several chopper designs.

Figure $6.3B.12$ shows the output from the detector when using a chopper. When the chopper blocks the source, the detector only reads the background flame noise. When the chopper lets the light through, both flame noise and source noise is detected. The magnitude of Po and P is shown on the diagram. By subtracting the combined source/flame signal from only the flame background it is possible to measure the magnitudes of Po and P and to determine whether the introduction of the sample is altering the magnitude of the flame background.

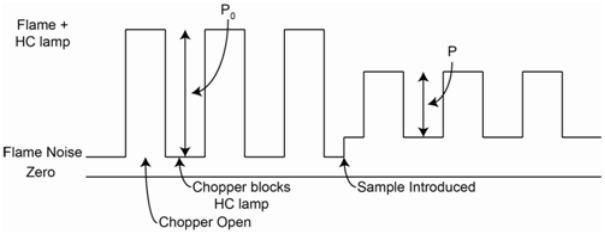

Figure $6.3B.12$. Output at the detector of a flame AA when using a chopper.