Abstract. It is shown that comparing an observed Fraunhofer profile to a fitted gaussian yields more information on shape and asymmetry of the solar line than the simple bisector method.

The bisector of a Fraunhofer line profile is a simple method of exhibiting its asymmetry. Slight asymmetries can be greatly magnified and observational noise smoothed. But in this descriptor much line profile information is lost. An alternative is to compare the observed profile to a gaussian or a Voigt profile from which we recover not only the asymmetry but also deviations in shape.

As an example I have chosen to compare the observed profile to a gaussian fitted at three points: the line center and two points to the red and violet at one half the central intensity as shown in Figure 1a. Most, but not all, Fraunhofer lines show damping wings
and a generally rectangular profile in the core; the difference between the gaussian and Fraunhofer profiles, expressed in percent of the central depth, is schematically illustrated in Figure 1b and will be the method of presentation in the remaining figures.

The present observations were made with the double pass spectrograph at the McMath solar telescope which has a symmetrical instrumental profile and a resolution of about 400000. The observations average over time and space i.e. the 5 min oscillations and the granulation field.

Strong Fraunhofer lines show the characteristic signature of Figure 1. As we move closer to the limb the pronounced asymmetry in the core nearly disappears; the wings are greatly reduced. The profile becomes more rectangular and the central depth decreases; that is the profile becomes more like a saturated gaussian. Figure 2 illustrates this behavior in the potassium line $\lambda 7699$ and in the narrow Ba II line $\lambda 6497$.

There is a smaller class of lines that appear to show quite a different behavior from that of the strong low excitation potential lines; their asymmetry is less and the lines are nearly gaussian in shape, particularly near the limb. We illustrate two of these lines

![Figure 2](image)

**Fig. 2.** Difference between a gaussian and the solar lines K I, $\lambda 7699$ and Ba II, $\lambda 6497$ for $\mu = \cos \theta$ values 1.0 to 0.1.