Design of the Philadelphia Community Radio Telescope (PCRT)

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Optics

By measuring the arc length along one of the PCRT petals, we were able to determine that the diameter of the dish is very nearly 10 meters. By inspection, the system appears to be a Gregorian design with a parabolic primary and elliptical secondary, with the Gregorian focus *in front* of the primary at the throat of a feed horn which projects through the primary mirror.

To successfully use the existing optics, we need to determine relevant parameters. The primary mirror edges are easy enough to read off from an image. We use the fact that

$$y = \frac{1}{4f}x^2 \tag{1}$$

is the equation of a parabola with focal length f, and also that we know x never exceeds $D/2$, so that

The secondary mirror appears to have a maximum diameter of 1.17 m.

The primary focal length is $f_p = 3$ m, so $f\#_p = 0.3$