Erratum page for first printing

Birefringent filters that are sensitive to the polarization state of the incident radiation can be configured to perform an anti-aliasing function,[4] although still without the ideal abrupt-cutoff MTF shown in Fig. 2.9. A filter of the type shown in Fig. 2.11 is particularly useful in color focal-plane arrays, where different spectral filters (red, blue, green) are placed on adjacent photosites. Because most visual information is received in the green portion of the spectrum the sampling interval for the red- and blue-filtered sensors is wider than for the green-filtered sensors. If we consider each color separately, we find a situation equivalent to the sparse-array configuration seen in Fig. 2.11, where the active photosites for a given color are shown shaded. The function of the birefringent blue filter is to split an incident ray into two components. A single point in object space maps to two points in image space, with a spacing equal to one-half the sensor-to-sensor distance. The impulse response of the filter is two delta functions:

$$h_{\text{filter}}(x) = \tfrac{1}{2}\{\delta(x) + \delta(x + x_{\text{samp}}/2)\}\ . \tag{2.9}$$

The corresponding filter transfer function can be found by Fourier transformation as

$$\text{MTF}_{\text{filter}}(\xi) = |\cos(2\pi(x_{\text{samp}}/4)\xi)|\ , \tag{2.10}$$

which has its first zero at $1/(x_{\text{samp}}) = 2\xi_{\text{Nyquist}}$. The birefringent filter thus provides a degree of prefiltering, in that the bandlimiting function is applied before the image is sampled by the detector array. The blur obtained using a birefringent filter is independent of the lens *F*/#, which is not the case when defocus is used as a prefilter. Typically *F*/# is kept solely to control the image-plane irradiance.

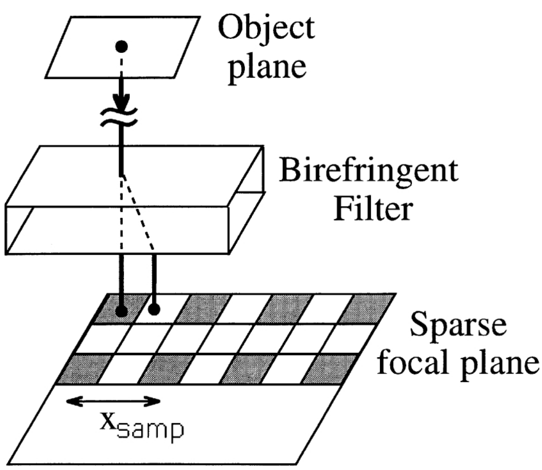

Figure 2.11 Mechanism of a birefringent antialiasing filter.