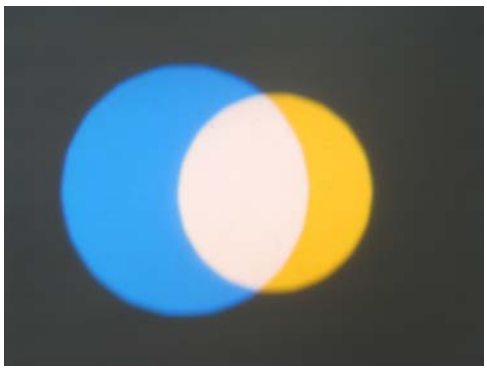
Answer #361

The answer is (b): the reflected color is indeed blue!



(Note: no "photoshop-ing" was done to the image in the spirit of scientific integrity; the white balance in the picture is a little off.)

Although it is true the dichroic filter is subtracting wavelengths from the white-light source to create negative colors, whatever is subtracted (i.e. reflected off the back of the filter) is being recombined in the overlapping region. If we add back what we subtracted, we get back the original "signal", which was white light.

Another way of looking at it is that, at the end of the day, light is being projected onto a screen. Such mixing is always additive, even if some of the light on the screen was a result of using negative filters.

It turns out dichroic filters needn't just reflect visible light! A neat, practical application of the filters at work are in theater, where spotlights, etc. are coated with infrared-wavelength dichroic filters! This way, any heat (generated by the incandescent light source) is redirected to the sides where it can dissipate more efficiently.

Question of the Week

Outreach Index Page

Lecture-Demonstration Home Page

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