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## The Ping-Pong Ball Color Mixer Revisited

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Inspired by a *TPT* article by Gorazd Planinšič,<sup>1</sup> the tri-color Ping-Pong ball color mixer is an inexpensive, readily assembled device for demonstrating additive color mixing.<sup>2</sup> The tri-color mixer consists of a single flashing LED<sup>3</sup> encased in a white Ping-Pong ball. The tri-color LED has a built-in chip that sequentially flashes each primary color quickly for about 5 seconds, then slowly fades the colors in and out over the next 30 seconds. Cyan, magenta, yellow, and white are created by the mixing of the three primary colors. Three “AA” cells in a battery holder serve as both power source and base for the apparatus (Fig. 1).

The ingenious Planinšič color mixer employs three discrete LEDs (red, blue, and green) to illuminate the inner surface of a Ping-Pong ball. Connected to potentiometers, each LED can be precisely controlled. Thus, a wide range of colors may be produced. The insertion of wire baffles in small slits in the Ping-Pong ball permits the production of colored shadows. While the color mixer described in this column lacks these features, it does allow the hands-on study of color mixing without the need for slide projectors or colored



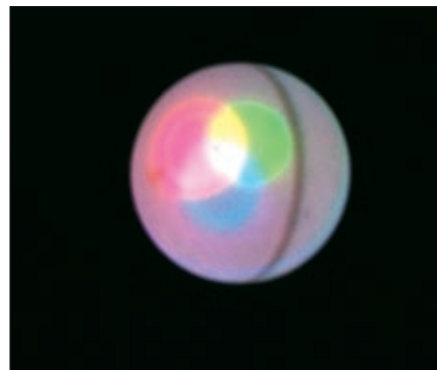
**Fig. 1. The tri-color Ping-Pong ball color mixer.**

spotlights.

Key to the operation of both mixers is the use of a Ping-Pong ball as a screen. In the case of the tri-color mixer, the LED's lens projects colored circles of light on the top of the Ping-Pong ball. When these colored circles overlap, one is reminded of the familiar color-mixing diagrams found in many physics texts. Because the interior surface of the Ping-Pong ball scatters light with equal intensity in all directions, the additive combination of the projected colors is seen at all viewing angles (Fig. 2).

### References

1. Gorazd Planinšič, “Color mixer for every student,” *Phys. Teach*, **42**, 138-142 (March 2004).
2. Detailed instructions for building



**Fig. 2. The Ping-Pong ball displays the additive combination of the primary colors as well as the primary colors themselves. Here red, blue, and green combine to produce white.**

the tri-color LED color mixer may be found online at <http://ftp.aip.org/cgi-bin/epaps?ID=E-PHTEAH-45-016702>. For more information on EPAPS, see <http://www.aip.org/pubservs/epaps.html>.

3. The flashing red, green, and blue LED (Catalog #LED-95) and holder for four “AA” cells (Catalog #BH-342) may be obtained from All Electronics Corporation (<http://www.allelectronics.com/index.html>). The costs of the LED and the battery holder are \$2.50 and \$0.80, respectively.