A High-Intensity Rectangular-Pulse Light Source for High-Speed Photography

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Workers in many fields who use high-speed photographic techniques have constantly searched for higher-intensity light sources and better means of shuttering the light. A method has been devised for constructing a self-shuttering light source of very high intensity. The principle involved is the use of an artificial transmission line which is designed to match the impedance of a terminating discharge tube. Once triggered, the transmission line maintains the voltage across the discharge tube at a constant value for a time which depends on the design of the line and the number of "L" sections in the line. At the end of this design time the voltage across the discharge tube drops abruptly to zero. The result is a light pulse which has a rectangular profile.

Four sources have been constructed and are operating very successfully in conjunction with several continuous-writing cameras. These sources give light pulses of durations from 100 μsec to 3 msec. The deviation away from an ideal rectangular pulse for the 3-msec line is less than 10%, while the deviation for the 100-μsec line is less than 1%. These deviations are due to resistive losses present in the line.

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