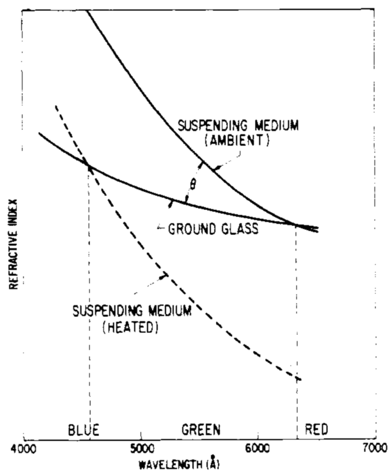


Fig. 1. Optical dispersion curves. Plot of refractive index versus wavelength for constituents of the Christiansen suspension in a display element. At ambient temperature the suspension transmits in the red where the solid curves cross. At higher temperature transmission is at shorter wavelength, e.g., in the blue (dashed curve).

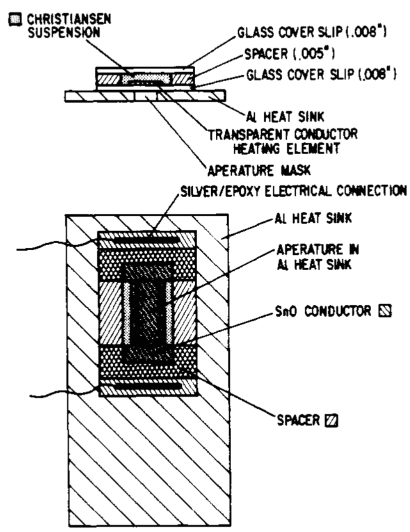


Fig. 2. Display element. Current flowing in the constricted zone of the SnO transparent conductor layer heats the Christiansen suspension above the aperture in the aluminum heat sink, thus changing the color of the transmitted light.

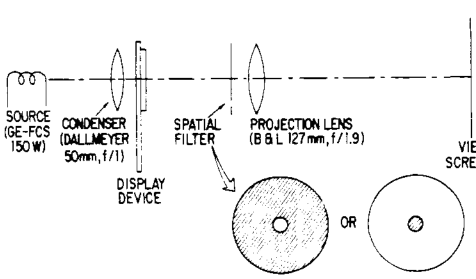


Fig. 3. Projector for Christiansen color display device.

ments. Also, to minimize operating power, the liquid should have a large thermal coefficient of expansion.

The optical system used for projection is shown on Fig. 3. The condenser formed a small image of the source in the entrance aperture of the projection lens. A spatial filter was placed there which consisted of an aperture congruent with the source image. A compact source was used to promote efficient spatial filtering. The system yielded a projected pattern in bright spectral colors. Alternatively, to view the pattern in complementary colors, a stop was used to occlude the source image. However, the pattern then appeared white in the "off" state of the heater.

A photoimaging system based on photochemical modulation of the refractive index of the suspending medium is described elsewhere [2], [3]. Reference [2] also discusses criteria for maximizing the crossover angle, Θ in Fig. 1, in a Christiansen suspension; and it reports measurements of color saturation as a function of film thickness, glass particle size, and volume loading of glass.

### References


[1] C. S. Strong, *Concepts of Classical Optics.* San Francisco, CA: Freeman, 1958, pp. 583–585.

[2] R. K. Waring, Jr., "Colored images by photochemical modulation of the Christiansen effect," submitted to *Phot. Sci. Eng.*

[3] —, "Color imaging by modulation of the Christiansen effect," U.S. patent 3 951 520.


## Correction to "Asymptotic Residual Pump Transmission Characteristics in Laser-Induced Stimulated Brillouin Scattering"

H. HSU

In the above letter,[1] equation (4) on page 1639 has an "=" inside the bracket. This is a misprint, and should read as a "-" in (4).

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[1]H. Hsu and C. Yu, *Proc. IEEE*, vol. 64, pp. 1638-1640, Nov. 1976.

## A Method for Deciphering a Maximal-Length Sequence

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***Abstract*—A simple method for determining the feedback polynomial coefficients of a maximal-length sequence is derived. The method is to look for the longest run of zeros in the received sequence and use those digits plus the preceeding *n* digits to compute the feedback polynomial coefficients. This method permits simple hand computation or hardware implementation for the computation of the coefficients.**


### I. Introduction

Maximal-length sequences are widely used in secure communication and data acquisition systems [1] due to the resemblance between their autocorrelation functions and those of truly random binary sequences. A maximal-length sequence can be generated by means of an $n$-stage shift-register with prescribed feedback connections via a mod-2 adder. Thus a binary maximal-length sequence can be uniquely specified by its feedback polynomial

$$h(X) = h_0 + h_1 X + \cdots + h_n X^n \tag{1}$$

where the degree $n$ of the polynomial is the length of the shift-register generator for the sequence, and the polynomial coefficient $h_i$, having the value zero or one, represents the feedback tap on the generator as shown in Fig. 1. If the binary feedback polynomial is a primitive polynomial, the sequence has length $L = 2^n - 1$ and is called the maximal-length sequence. A large number of different maximal-length sequences can be generated from a shift-register of given length by selecting different taps to be fed back. If $h(X)$ is not a primitive polynomial, the generator can produce more than one sequence, each of which has a period less than $L$. These sequences are called non-maximal-length sequences. For detailed algebraic structure of maximal-length sequences, readers are referred to Golomb [2].

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