pressure windows, was 1.28 over the band of interest.

The measured stop band insertion loss is shown in Fig. 4. The insertion loss of the TE_{10} mode was measured using smooth tapered sections from waveguide connected directly to the input and output of the filter. A continuously swept signal generator was connected at the input and the filter output was monitored on a scope. A TWT amplifier operating from 4–11 Gs/c provided additional sensitivity throughout this band. The limit of measurements for the other frequencies of interest was 55 dB. Point-to-point receiver measurements were taken throughout the band of limited sensitivity.

A point of further interest concerned the location of the waffle-iron filter assembly relative to the radar system duplexer. Figure 5 illustrates the results of dynamic co-operative tests performed by the radar and a microwave link station operating at the subject radar's third harmonic frequency. The objectives of the test was to ascertain: 1) the effectiveness of this waffle-iron filter in reducing interference levels beyond the television fade margin of the microwave link and 2) to determine the optimum location for the waffle-iron filter assembly relative to the duplexer in the radar system.

It can be seen from the graph that the range of levels received with the waffle-iron filter before the duplexer were 5 dB below the fade margin for teletype but still within the television fade margin. Placing the filter on the antenna side of the duplexer resulted in mean signal levels 17 dBm below the previous reading. This data furnishes conclusive proof of TR tube harmonic radiation and the necessity for packaging such waffle-iron filters on the antenna side of the duplexers.

This correspondence has shown that waffle-iron filters can be utilized at moderate power levels at L-band. Higher levels could also be achieved by utilizing a technique of paralleling filters [3] using binary symmetrical power dividers. Thus, a double layer filter could be packaged within the dimensions of L-band waveguide. By dividing the power among two filters and then recombining their outputs, the power handling capacity is doubled.

Heavy wall construction was utilized (Fig. 1) to provide distortion free operation with high internal pressures. A considerable weight savings can be achieved if a ribbed construction were used with a thin wall thickness.

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[2] E. Sharp, "A high-power wide-band waffle-iron filter," *IEEE Trans. on Microwave Theory and Techniques*, vol. MTT-11, pp. 111–116, March 1963.
[3] Young and B. M. Schiffman, "New and improved types of waffle-iron filters," *Proc. IEE (London)*, vol. 110, July 1963.

Correction to "Exact Design of Band-Stop Microwave Filters"

In the above paper[1] the authors have called the following to the attention of the Editor:

The formula for Z_4, for case $n=5$ in Table II (page 8), should have read

$$Z_4 = \frac{Z_A}{g_0}\left(\frac{1}{1+Ag_5g_6} + \frac{g_6}{Ag_4(1+Ag_5g_6)^2}\right).$$

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[1] B. M. Schiffman and G. L. Matthaei, *IEEE Trans. on Microwave Theory and Techniques*, vol. MTT-12, pp. 6–15, January 1964.

The Electric Field and Wave Impedance in Spin Wave Propagation

The propagation of electromagnetic waves in magnetic materials, allowing exchange coupling, has been treated by Auld [1] and by Soohoo [2]. Their calculations involved the simultaneous solution of Maxwell's equations and the equation of motion of the magnetization, for plane waves.

According to the well known results of Auld [1] for ferrimagnetic materials, the susceptibility tensor is of the same form as the well-known Polder tensor for the uniform mode, except that the internal static magnetic fields are augmented by an exchange field in the case of magnetic waves with a finite wave vector $\boldsymbol{k}$. Depending on the magnitude of $\boldsymbol{k}$, the various plane waves could be classified into electromagnetic, magnetostatic, and exchange types.

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In the interpretation of these results, the statement has been made that as the spin wavelength becomes shorter and shorter, the RF electric field becomes increasingly smaller compared with the RF magnetic field and can eventually be neglected.

We suggest that this statement is perhaps somewhat too strong, for it is desirable to examine not only the ratios of absolute quantities of electric and magnetic fields, but such quantities as the transverse wave impedance. Here we find the general rule that as the wavelength decreases, the wave impedance increases. This is seen by substitution of a magnetic field intensity of form $[\hat{x}h_0+\hat{y}h_1][\exp\{j(\omega t-kz)\}]$ into the Maxwell curl equation, in the absence of conduction current. The result is

$$\boldsymbol{e} = [\hat{x}(h_1)(k/\omega\epsilon_r\epsilon_0) + \hat{y}(-h_0)(k/\omega\epsilon_r\epsilon_0)] \cdot \exp[j(\omega t - kz)] \quad (1)$$

so that

$$Z_{\text{transverse}} = |e_x/h_y| = |e_y/h_x| = k/\omega\epsilon_r\epsilon_0. \quad (2)$$

As the wavelength gets shorter, k becomes larger; so that the ratio $|e/h|$ increases. At 10 Gc, for example, for $\epsilon_r=15$, and for wavelength $\lambda_g=(5)(10^{-7})$ meters, $|e/h|=(1.5)(10^6)$ ohms. Direct substitution of the appropriate quantities into Auld's expressions yields essentially the same result.[1]

[1] In private communications, Dr. Auld stated that he was aware of this and of the field structure. We appreciate Dr. Auld's kindness in communicating with us on this subject.

TABLE I

Wave Components for Spin Wave Propagation, for Circularly Polarized RF Magnetization

The dc magnetic field is taken in the z direction. Propagation is in the Y—Z Plane. Note that although the RF magnetization is circularly polarized, $\boldsymbol{e}$, $\boldsymbol{h}$, and $\boldsymbol{b}$ are circularly polarized only for $\theta=0°$. For this table, the units are MKS rationalized, with $\boldsymbol{b}=\mu_0(\boldsymbol{h}+\boldsymbol{m})$; $\epsilon=\epsilon_r\epsilon_0$; $k_f=\omega(\epsilon\mu_0)^{1/2}$.

	$\theta_k = 0°$	$\theta_k = 90°$
$\boldsymbol{m}$	$m_0 \begin{bmatrix}-1\\ j\\ 0\end{bmatrix} e^{j[\omega t-kz]}$	$m_0 \begin{bmatrix}-1\\ j\\ 0\end{bmatrix} e^{j[\omega t-ky]}$
$\boldsymbol{e}$	$-m_0 \left(\frac{k_f}{k}\right)\left(\frac{\mu_0}{\epsilon}\right)^{1/2} \begin{bmatrix}-j\\ 1\\ 0\end{bmatrix} e^{j[\omega t-kz]}$	$m_0 \left(\frac{k_f}{k}\right)\left(\frac{\mu_0}{\epsilon}\right)^{1/2} \begin{bmatrix}0\\ 0\\ -1\end{bmatrix} e^{j[\omega t-ky]}$
$\boldsymbol{h}$	$m_0\left(\frac{k_f}{k}\right)^2 \begin{bmatrix}1\\ j\\ 0\end{bmatrix} e^{j[\omega t-kz]}$	$m_0 \begin{bmatrix}-(k_f/k)^2\\ -j\\ 0\end{bmatrix} e^{j[\omega t-ky]}$
$\boldsymbol{b}$	$\simeq\mu_0 m_0 \begin{bmatrix}-1\\ j\\ 0\end{bmatrix} e^{j[\omega t-kz]}$	$\mu_0 m_0 \begin{bmatrix}-1\\ 0\\ 0\end{bmatrix} e^{j[\omega t-ky]}$