integrated over all angles to find an average coefficient for a bundle of rays incident, we find

$$C_{av} \simeq \gamma\beta^2. \quad (3)$$

Equation (3) may be applied to outbursts of radio noise on the sun, for which several authors have suggested that plasma waves are responsible. To do this, an estimate of the intensity of the plasma waves is needed. If we assume that the presence of second harmonic in the outburst spectra indicates that the electron density perturbations of the plasma waves approach the quiescent electron densities, we find that the emission from a flare surge, with which the outbursts are correlated, is from 10^4 to 10^7 times that observed. This result applies to a discontinuity in μ^2 ; the favorable factor makes it possible that the coupling mechanism suggested here will be efficient enough even if less sharp gradients are considered.

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Firor, John. Brightness distribution of the sun at 1.45 m.

The brightness distribution of the quiet sun has been derived from measurements made during 1954 near the minimum of the sunspot cycle, with a variable spacing interferometer operating at 1.45 m wave length. In deriving the brightness distribution the sun is assumed to have circular or elliptical symmetry. The distribution obtained from these measurements agrees well with that predicted by Smerd, who assumes a coronal temperature of 10^6 °K, chromospheric temperature of 3×10^4 °K and electron density

$$N = 10^8(1.55r^{-6} + 2.99r^{-16}) \text{ cm}^{-3}$$

in the corona and, in the chromosphere,

$$N = 5.7 \times 10^{11} \times \exp[-7.7 \times 10^{-4}(h-500)] \text{ cm}^{-3},$$

where r = the distance from the center of the sun in units of the optical radius, and h is the height above the photosphere in km.

This brightness distribution has strong limb brightening, somewhat inside the optical limb, and has a considerable extension outside of the optical limb.

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Gifford, Frank, Jr., Johnson, Harold and Wilson, Albert. Heights of scintillation layers in the earth's atmosphere.

From observations of correlations in the amount of scintillation in double stars of various separations, it has been found that one to ten cycle scintillation is generated in layers which occur above 60,000 feet and on occasions as high as 100,000 feet. On the other hand, scintillation in the neighborhood of 150 cycles generally occurs at heights of from 10,000 to 40,000 feet. Further, excursions or image motions, are caused by atmospheric disturbances within a few hundred feet of the ground.

These findings are consistent with the prediction that scintillation can occur only in an atmospheric region having a non-adiabatic lapse rate or a temperature inversion. The light easterlies in the stratosphere may account for the observed high-level low-frequency scintillation while the stronger westerlies in the region of the tropopause may explain the low-level high-frequency scintillation.

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Haddock, F. T. and McCullough, T. P., Jr. Extension of radio source spectra to a wave length of 3 centimeters.

To extend the spectrum of discrete sources a survey was undertaken during July, 1954, at wave length 3.15 cm (9500 Mc/sec) of known sources, principally of those detected by Haddock, Mayer, and Sloanaker (1954) at wave length 9.4 cm. An antenna beam $8' \times 9'$ in width and chopper-type radiometer was used.

Seven sources were detected: the Orion Nebula and two other emission nebulae, NGC 1976, 6618 and 6357; three well-known non-thermal sources, Cassiopeia-A, Cygnus-A, and Taurus-A (Baade and Minkowski, 1954); and a source suggested as the galactic nucleus (McGee and Bolton, 1954; Hagen and McClain, 1954) denoted by 17S2A (NRL No. 5). These sources represent the first detection at a wave length shorter than 9.4 cm of galactic and extragalactic radio emission. The small beam made it possible to estimate the size of several sources; about $\frac{1}{4}^\circ$ for NGC 1976, NGC 6357 and 17S2A, and about $\frac{1}{8}^\circ$ for NGC 6618. The intensity found for the Orion nebula is consistent with the thermal model of this source derived from the 9.4 cm measurements. The intensities of the two other emission nebulae, when compared to their intensi-