of the primary and secondary ionization coefficients obtained are shown on the figure. It is interesting to note that the experimentally observed growth is in agreement (well within the experimental error) with the generalized Townsend equation of growth with constant values of the coefficients α and ω/α.

The values of the primary ionization coefficient obtained from the measurements over the range of very low values of E/p from 3 to 5 V cm^{-1} mm Hg^{-1} are shown in Fig. 2. It was found that over a range of gas pressures of 150–560 mm mercury the similarity relationship $\alpha/p = f(E/p)$ was obeyed. Comparison of the present results with previous theoretically computed values[5,6] and experimental values[7–9] of α/p at higher values of E/p and lower pressures is made in Fig. 2, and it can be seen that the present results lie between the extrapolation of the experimental curves of Townsend and McCallum and those of Davies, Llewellyn-Jones and Morgan. Further work is in progress in attempts to obtain samples of gas at high pressures of higher purity and on the effects of known small amounts of impurities on the values of the ionization coefficients in helium.

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Effect of Capacitor Arrangement on the Symmetry of Linear Pinch Discharges

ALL applications of linear pinch devices require that the current distribution in the discharge be symmetric about the axis of symmetry of the electrodes. Symmetry is not difficult to achieve when the energy supplied to the discharge is much greater than the minimum energy required for the discharge. However, certain applications, such as plasma accelerators for space-vehicles, require that the energy supplied be near the minimum value. When operating near the minimum energy condition, factors which may be unimportant for high-energy operation can have a marked influence on the discharge symmetry.

The effect of capacitor arrangement on the symmetry of a linear pinch discharge during the phase of the discharge when the current distribution was moving toward the axis was investigated using a pinch plasma accelerator[1]. Nine 10-μF capacitors, rated at 3 kV, were connected to 8-in. diameter aluminium electrodes by means of a 16-in. diameter parallel-plate radial transmission line. The discharge was initiated by briefly opening a solenoid valve which admitted a pulse of nitrogen into the previously evacuated interelectrode space. Four magnetic probes were inserted into the interelectrode space at the same radius at 90° intervals about the axis of symmetry of the electrodes. Probe signals were recorded simultaneously with the set of four probes positioned at various radii. The symmetry of the discharge was determined by comparing the magnitude and time of arrival of the signals.

When the nine capacitors were connected to the transmission line plates symmetrically, the discharge was found to be symmetric at capacitor voltages greater than 2·75 kV. The capacitors were then arranged asymmetrically by connecting them to the transmission line plates within a 270° angle, the other quadrant being vacant. For this case, symmetric discharges could not be obtained at 3 kV. This result indicates that when the capacitors are not arranged symmetrically, the current may not be distributed uniformly enough throughout the transmission line plates for a symmetric discharge to occur. This non-uniform current distribution is undoubtedly due to the tendency of the current to take the lowest impedance path to the electrodes. A similar effect probably also occurs with discharges in other geometries such as the coaxial plasma gun.

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Electron Spin Resonance Evidence of Radiation-induced Electrons trapped in Organic Glasses at 77° K

IT has been suggested in the radiation chemistry of the simple aliphatic alcohols, ethanol[1] and methanol[2,3], that γ-irradiation in the liquid state leads to the formation of positive and negative charged species:

$$2CH_3CH_2OH \rightarrow (CH_3CH_2OH)^+ + (CH_3CH_2OH)^-$$

The negative species, the solvated electrons, were shown to be involved in the chemical changes observed from their reactions with certain specific solutes: H^+, chloroacetate, 2-chloroethanol, diphenyl, naphthalene. More recently, various organic glasses[4] were irradiated at 77° K and in the case of ethanol[4,5] the absorption band formed at 5400 Å was accounted as due to solvated electrons. We present electron spin resonance evidence of radiation-induced electrons trapped or solvated in glasses at 77° K in the radiolysis of alcohols.

A conventional electron spin resonance spectrometer (Strand Laboratories, Inc., Model 601 *AX*) was used with a cylindrical reflexion cavity operating in the *T.E.* 011 mode, resonant frequency of the cavity 9,500 Mc/sec. All the alcohols were irradiated in thin 'Spectrosil' silica tubes in the absence of oxygen. Various alcohols have already been studied[6,7] by electron spin resonance, and some of the effects to be described here (ultra-violet irradiation and visible bleaching of unbuffered alcohols) were observed by these authors[6,7] without assigning an interpretation to them.

On γ-irradiation of, say, ethanol as a glass at 77° K it is known to turn to a dark purple colour and give a five-line paramagnetic resonance line. The intensity ratios of the lines are not binomial (1 : 4 : 6 : 4 : 1) at 77° K, the centre line appearing definitely more intense. The dark purple colour centres can be bleached by various means: (1) by thermal bleaching, when the temperature of the glass is increased to about 115° K, (2) by exposure at 77° K of the γ-irradiated glass to light in the visible range: the colour centres are rapidly bleached (2 min) by a white table-lamp light. Furthermore, on adding initially certain solutes such as acids, I_2, diphenyl, naphthalene, and 2-chloroethanol the purple colour is not formed on irradiation. All these solutes are known to react efficiently with electrons. The interesting observation is that following the foregoing methods when the irradiated glasses are colourless the centre line is attenuated while the five-line spectrum persists (in some cases becomes even stronger). It is therefore clear that the purple colour is associated with the single paramagnetic resonance line, which is nearly centred on the basic five-line spectrum of the $CH_3\dot{C}HOH$ radical. It was suggested[6] that this single line may be due to the positive ion of ethanol. However, the results obtained, particularly in the presence of various additives, are inconsistent with this suggestion. We