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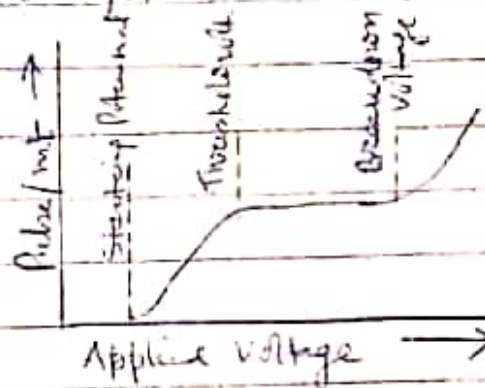
G.M. Counter [continued...]

When an ionising radiation passes through the tube, it ionises the gas along its path. The voltage in the tube is higher enough to accelerate the electrons towards the anode & they produce more ions by collision in the neighbourhood of the central wire. This multiplication effect is known as avalanche & the total number of ion pairs produced by a single primary ion pair is called the gas multiplication factor. This factor can be as high as 10^8 or more for the GM region. The primary ionisation in the tube initiates a series of events in the tube. However, the initial avalanche is followed by a succession of avalanches along the wire. Ultraviolet photons are produced during an avalanche which initiate a series of avalanches and hence ~~convey~~ convey the discharge down the whole

length of the wire. The velocity of propagation is about 10^6 to 10^7 cm/sec & as a result of this the charge collected by the wire has a constant value, independent of magnitude and location of the initial ionisation. The total discharge produced by a primary ion pair produces a voltage pulse across R.

This after amplification is counted by a scaler. The whole system then returns to the initial stage & is ready for the next count.

The suitable voltage to be applied to the GM Counter is determined from the study of the characteristic curve for the counter shown below.



The range of voltage over which the pulse rate is constant is called the Geiger plateau. The operating voltage for the GM tube is chosen somewhere in the middle of the plateau.

One of the troublesome features of the GM Counter is that when an ionising particle produces an avalanche, the resulting discharge pulse may continue for sometime. Consequently if another particle enters the tube before the discharge is complete, the pulse due to this is not resolved from the previous pulse & hence it is not separately counted by

The Sclar. The continuation of the discharge or the formation of the multiple discharge is due to the sheath of the +ve ions. The positive ions on reaching the cathode eject electrons from the cathode which leads to multiple discharge.