

A DIRECT PHOTOELECTRIC DETERMINATION OF
PLANCK'S "h."¹

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While this was the main if not the only basis of Einstein's assumption, this assumption enabled him at once to predict that the maximum energy of emission of corpuscles under the influence of light would be governed by the equation

$$\frac{1}{2}mv^2 = V \cdot e = h\nu - \phi, \quad (1)$$

in which $h\nu$ is the energy absorbed by the electron from the light wave, which according to Planck contained just the energy $h\nu$, ϕ is the work necessary to get the electron out of the metal and $\frac{1}{2}mv^2$ is the energy with which it leaves the surface, an energy evidently measured by the product of its charge e by the P.D. against which it is just able to drive itself before being brought to rest.

P.D. : différence de potentiel (tension électrique)

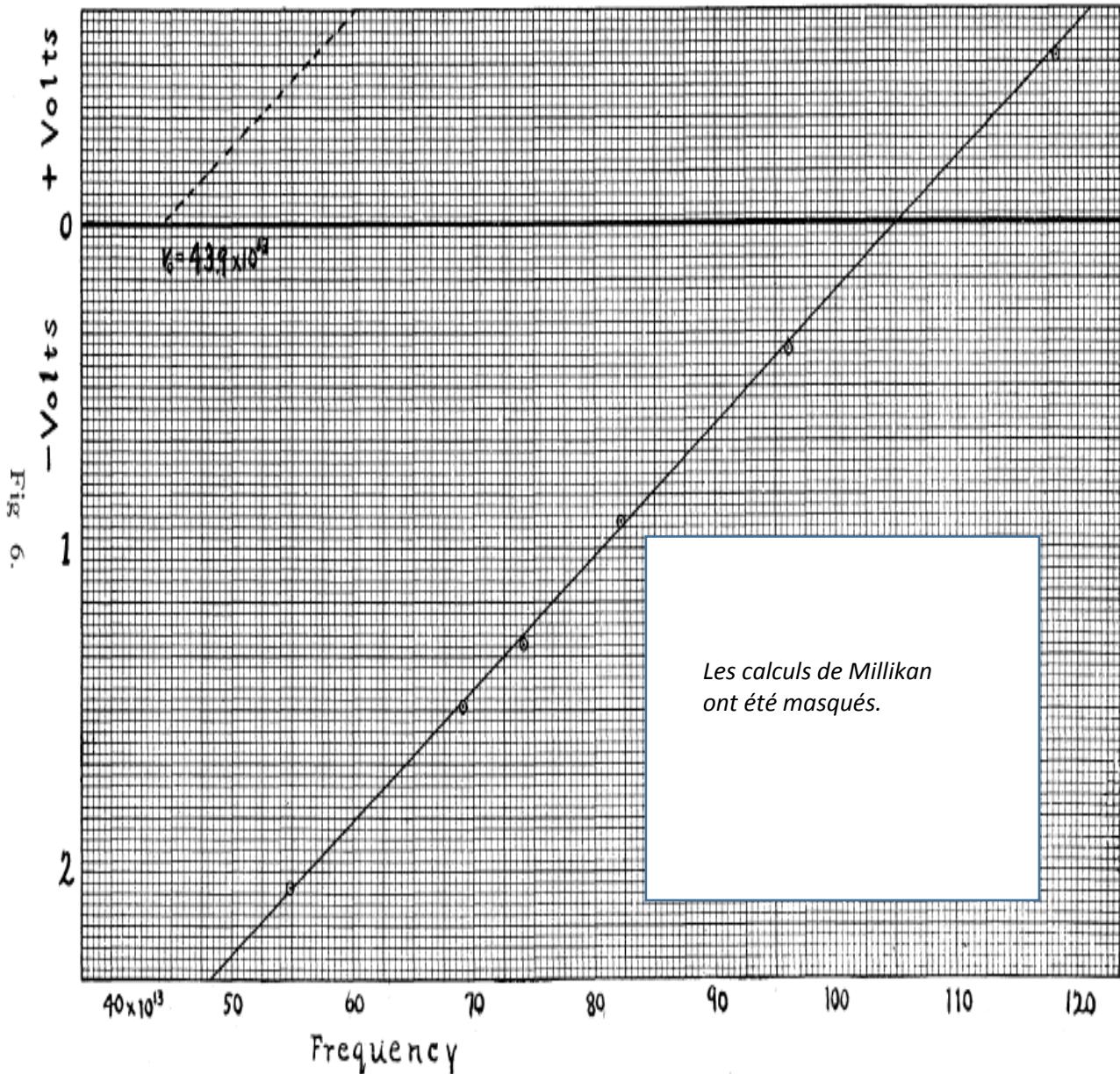
[...]

Nevertheless, the following results seem to show that at least five of the experimentally verifiable relationships which are actually contained in equation (1) are rigorously correct. These relationships are embodied in the following assertions:

1. *That there exists for each exciting frequency ν , above a certain critical value, a definitely determinable maximum velocity of emission of corpuscles.*
2. *That there is a linear relation between V and ν .*
3. *That $\frac{dV}{d\nu}$ or the slope of the $V \nu$ line is numerically equal to h/e .*
4. *That at the critical frequency ν_0 at which $v = 0$, $\phi = h\nu_0$, i. e., that the intercept of the $V \nu$ line on the ν axis is the lowest frequency at which the metal in question can be photoelectrically active.*

[...]

No one of these points except the first¹ had been tested even roughly when Einstein made his prediction and the correctness of this one has recently been vigorously denied by Ramsauer.²



Note : la charge élémentaire e est égale à $1,6 \times 10^{-19}$ C