oublets, were obtained in absorption as ing table and in fig. 1. Several forbidden nd. The greatest n measured and the depended strongly upon the temperature.

	K, $4s$–np	Rb, $5s$–np	Cs, $6s$–np
. . . .	76	73	66
t . . .	14	22	15

REFERENCES

Mack, Rev. Mod. Physics, **14**, 104, 1942.
Mack, Journ. Opt. Soc. Am. **32**, 457, 1942.

Physica XII, no 9–10 December 1946

ON THE ENERGY LEVELS OF A MODEL OF THE COMPRESSED HYDROGEN ATOM

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87th Communication of the Van der Waals Fund.
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Summary

In the problem of the "compressed hydrogen atom" the boundary condition that the wave function φ must be zero for infinite r, is replaced by the condition that φ must have a zero point at a finite $r = r_0$. This leads to an investigation of properties of the zeros of the confluent hypergeometric function. The shifts of the $1s$, $2s$ and $2p$ levels by compression are calculated and tables and graphs are given for corresponding values of the energy and of r_0.

§ 1. *Introduction.* In the usual treatment of the Schrödinger equation for the hydrogen atom the boundary conditions imposed on the wave function φ are: regular behaviour in the origin and a node at infinity. It will however be supposed here that the hydrogen atom is enclosed in a sphere of radius r_0 [1) 2)]. At the position r_0 is an infinitely high and steep potential wall. So the wave function must now have a zero point at $r = r_0$ instead of at $r = \infty$. The new boundary condition influences only the radial part $R(r)$ of the wave function. The equation for $R(r)$ can be written in atomic units *):

$$\frac{d^2R}{dr^2} + \frac{2}{r}\frac{dR}{dr} + \left\{2E + \frac{2}{r} - \frac{l(l+1)}{r^2}\right\}R = 0, \qquad (1)$$

with E the energy and l zero or a positive integer.

With the relations

$$\rho = 2r/n \text{ and } E = -1/2n^2, \qquad (2)$$

*) Fundamental units e, m, and $\hbar = h/2\pi$. The unit of length is then $a_0 \equiv \hbar^2/me^2$ and the unit of energy is e^2/a_0 (Michels, De Boer and Bijl [1]) take $e^2/2a_0$ as unit of energy).