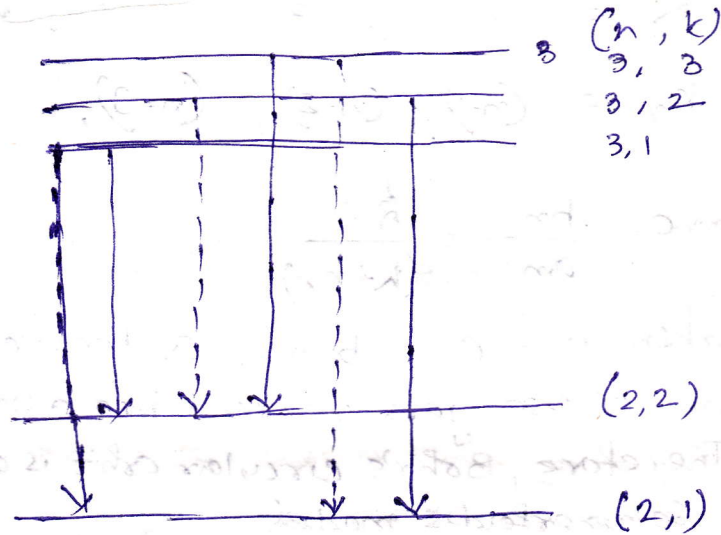


An attempt to explain the fine spectra in the light of Sommerfeld's first modification

$n=3$  to  $n=2$   $\rightarrow$  H $\alpha$  line in Balmer series

<u><math>n=3</math></u>	<u><math>n=2</math></u>
$k = 1, 2, 3$	$1, 2$
$m_l = 2, 1, 0$	$1, 0$



In this model, we are having a number of ways in contrast to the only one way in Bohr's model to generate the line, but in all the cases the energy changes will be identical, as the energy is dependent only on  $n$  as in Bohr's model and it does not depend upon  $m$  or  $k$  individually. Thus in spite of the existence of more than one possible way to produce the H $\alpha$  line in Balmer series, we get only one frequency for the radiations.

Thus the first modification led by Sommerfeld cannot remove the drawback of the Bohr's model.

B: Sommerfeld's second modification i.e. the relativistic correction and explanation for the fine structure of the spectral lines