

Copy of a printed graph referenced as "Contours of ψ [psi] for a tetrahedral hybrid orbital of carbon"

Contributors

Fuller, Watson, 1935-

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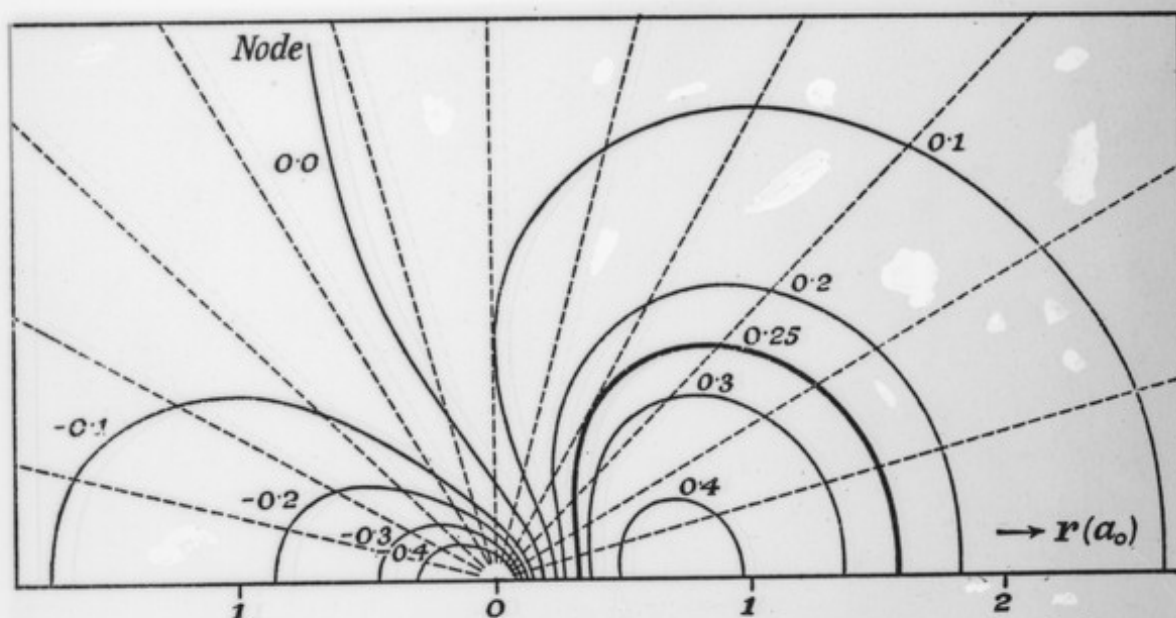
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hybrid $\frac{1}{2}(s + \sqrt{3}p_a)$ is formed from the overlap of the s orbital (shown as a dot) and the p_a orbital (shown as a vertical line) on the right-hand side of the nucleus. On the left, they are of opposite sign. So the result of adding s to $\sqrt{3}p_a$ is to accentuate the right-hand side, and diminish the left. Consequently the



Contours of ψ for a tetrahedral hybrid orbital of carbon. Only the top half of a section through the axis of symmetry of the orbital is shown. The complete set of contours would be obtained by rotation around the axis of x .

tetrahedral hybrid is able to overlap very strongly with an attached group, and thus gives strong binding. An accurate calculation of the contours of constant ψ yields the curves shown in Fig. 3.† ψ has axial symmetry around the direction Oa , so that the complete set of contours may be obtained by rotating those shown in the figure around the base line. The axial symmetry shows that bonds formed by direct overlap of orbitals of this kind will be σ -type bonds.

We can now understand the tetravalence of carbon in, for example, the paraffin series. Each carbon atom is imagined to be