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Received 16 January 2006; accepted 1 February 2006

The search for the Higgs boson at the Large Hadron Collider (LHC) will be based on the analysis of the decay products of the Higgs boson. The allowed decay channels are  $1S-2S$ ,  $1P-2P$  and  $P-P$ . The  $1S-2S$  decay channel is the most interesting one because it can be used to measure the mass of the Higgs boson. The  $1P-2P$  decay channel is also interesting because it can be used to measure the coupling constant of the Higgs boson. The  $P-P$  decay channel is the least interesting one because it cannot be used to measure the mass or coupling constant of the Higgs boson.

\* 10.1103/174045316

73.20.-r, 73.22.-r, 73.43.-r

## I. INTRODUCTION

The search for the Higgs boson at the Large Hadron Collider (LHC) will be based on the analysis of the decay products of the Higgs boson. The allowed decay channels are  $1S-2S$ ,  $1P-2P$  and  $P-P$ . The  $1S-2S$  decay channel is the most interesting one because it can be used to measure the mass of the Higgs boson. The  $1P-2P$  decay channel is also interesting because it can be used to measure the coupling constant of the Higgs boson. The  $P-P$  decay channel is the least interesting one because it cannot be used to measure the mass or coupling constant of the Higgs boson.

$$\frac{b/200}{\mathcal{E}_0^e+\mathcal{E}_0^h} \cdot \frac{h/20}{\mathcal{E}_0^e+\mathcal{E}_0^h}$$

$$\frac{N}{N'} \leq \frac{\alpha^2}{\alpha^2 - 2\alpha + 2} = \frac{1}{1 - 2(\alpha - 1) + \frac{2}{\alpha}} \leq N$$

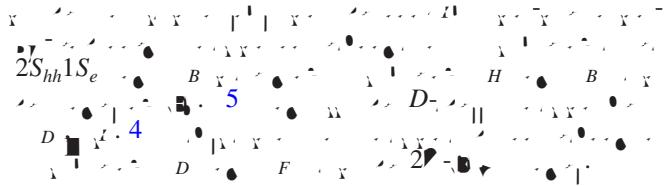
$\alpha > 1$

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$b/252$ ,  $1P_{hh}$ - $1P_{e^+}$  36.0

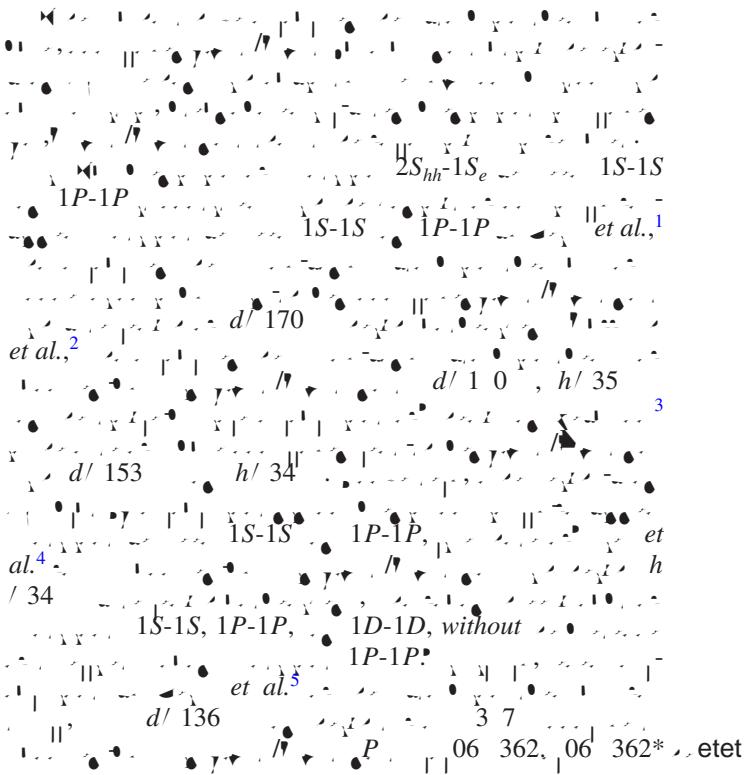
3. C b~~e2~~ ced, ~~e2~~, ~~e2~~, a a e, b dd~~e2~~~~e2~~, e, ~~e2~~ e-

a, c e dg, c, ~~e2~~



C. C

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- <sup>20</sup> 75, 344 1999  
<sup>21</sup> 89,  
216 04 2002 .  
<sup>22</sup> 190, 467 2002 .  
<sup>23</sup> 95, 1 6406 2005 .  
91, 5105 2002 .  
64,  
61301 2001 .  
<sup>24</sup> 70, 235204  
2004 71, 16 01 2005 .  
<sup>25</sup> 57