



Contribution ID: 901

Type: **Parallel Talk**

## Search for Higgs-like particle produced in association with $b$ quarks and measurement of $Z \rightarrow b\bar{b}$ cross section at CDF II

*Thursday, July 6, 2017 5:15 PM (15 minutes)*

We present a search for a Higgs-like particle  $\phi$  decaying into  $b\bar{b}$  produced in association with  $b$  quarks in  $p\bar{p}$  collisions. The event sample corresponds to  $5.4 \text{ fb}^{-1}$  of integrated luminosity collected with the CDF II detector at the Tevatron collider using a single  $b$  tagged jet trigger. We search for an enhancement in the mass of the two leading jets in event with at least three jets identified as coming from  $b$  quarks. A data-driven procedure is applied to estimate the dijet mass spectrum of the non-resonant multijet background, which has been used to measure the production cross-section of the  $Z$  decaying into  $b\bar{b}$  in the same sample but with at least two  $b$ -jets. We set one of the most stringent upper limits on  $\sigma(p\bar{p} \rightarrow \phi b) \times \mathcal{B}(\phi \rightarrow b\bar{b})$  in the  $100 - 300 \text{ GeV}/c^2$  mass range.

### Experimental Collaboration

CDF

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