

The bottom quark mass at high scale

martes, 20 de octubre de 2026 13:50 (20)

Measurements at electron-positron colliders can probe the scale evolution of quark masses predicted by the Standard Model in several ways. LEP and SLD extracted $m_b(m_Z)$ from three jet rates in $Z \rightarrow b \bar{b}$

decay. A future Z-pole run can improve the precision considerably, while a measurement of m_b at higher scale is possible from $e^+e^- \rightarrow b \bar{b}$ production at 250 GeV and above. A

very precise determination of $m_b(m_H)$, with an uncertainty of 10s of MeV, can be achieved from measurements of Higgs decay rates in the Higgs factory runs at $\sqrt{s} = 250$ GeV and 550 GeV.

In this contribution, we present the state-of-the-art extraction of $m_b(m_H)$ at the LHC, which is measured by the ATLAS experiment to be 2.73 ± 0.27

-0.25 GeV, and provide updated projections for the

HL-LHC and future colliders. We also present a proposal for an alternative methodology, where $m_b(m_H)$ and the bottom-quark Yukawa coupling are extracted simultaneously to provide a more model-independent result, as well as projections for the sensitivity of such extraction in a future electron-positron collider.

Presenter(s) : RAMIREZ ALFARO, Juan (IFIC, CSIC-UV)

Clasificación de la sesión : Theory and analysis