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Exclusive Top Threshold Matching at Lepton Colliders

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The threshold scan at future lepton colliders is the most precise known method to determine the top quark mass (well below 100 MeV), a fundamental parameter of the Standard Model that co-determines the stability properties of the electroweak vacuum. We present a new method to match the continuum next-to-leading order QCD corrections with the next-to-leading logarithmic resummation of the Coulomb singularities of the quasi-toponium bound state at threshold where fixed-order perturbation theory is invalid. This matching is performed at the level of the fully exclusive WbWb final state. It allows to study all kinds of differential distributions at or close to threshold. The top mass dependence of these distributions opens up new possibilities for the top mass determination that might be competitive with the inclusive threshold scan.

Primary authors: REUTER, Jürgen (DESY Hamburg, Germany); HOANG, Andre (University of Vienna); KILIAN, Wolfgang (University of Siegen); STAHLHOFEN, Maximilian (JGU Mainz); TEUBNER, Thomas (U)

Presenter: REUTER, Jürgen (DESY Hamburg, Germany)

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