

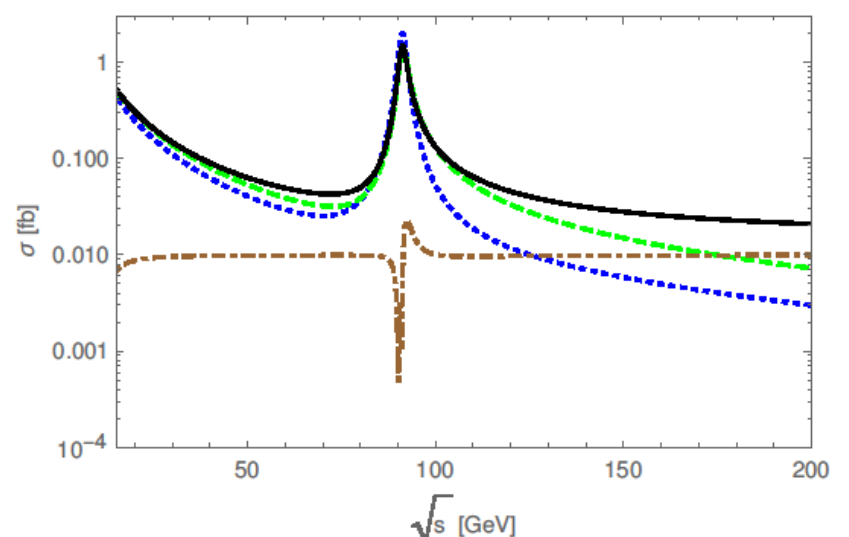
## The effects of $O(\alpha^2)$ initial state QED corrections to $e^+e^- \rightarrow \gamma^*/Z^*$ at very high luminosity colliders.

**Tuesday, 04 February, 2020, DESY Auditorium, 16:45 h**

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We present the recently completed  $O(\alpha^2)$  initial state corrections to the process  $e^+e^- \rightarrow \gamma^*/Z^*$ , which is a central process at past and future high energy and high luminosity colliders for precision measurements of the properties of the Z-boson, the Higgs boson, and the top quark. We observe differences to an earlier result in the non-logarithmic contributions at  $O(\alpha^2)$ .

The new result leads to a 4 MeV shift in the Z width considering the lower end  $s_0 = 4 m_{2\tau}^2$  of the radiation region, which is larger than the present accuracy. We present predictions on the radiative corrections to the central processes  $e^+e^- \rightarrow \gamma^*/Z^*$ ,  $e^+e^- \rightarrow ZH$  and  $e^+e^- \rightarrow t\bar{t}$  planned at future colliders like the ILC, CLIC, Fcc-ee and CEPC to measure the mass and the width of the Z boson, the Higgs boson and the top quark, for which the present corrections are significant.



- Coffee, tea and cookies will be served at 16:30h
- After the colloquium there is a chance for private discussions with the speaker over drinks and pretzels