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Electroweak non-resonant corrections to $e^+ e^- \rightarrow W^+ W^- b \bar{b}$ in the $t \bar{t}$ resonance region

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We analyse subleading electroweak effects in the top anti-top resonance production region in $e^+ e^-$ collisions which arise due to the decay of the top and anti-top quarks into the $W^+ W^- b \bar{b}$ final state. These are NLO corrections adopting the non-relativistic power counting $v \sim \alpha_s \sim \sqrt{\alpha_{EW}}$. In contrast to the QCD corrections which have been calculated (almost) up to NNNLO, the parametrically larger NLO electroweak contributions have not been completely known so far, but are mandatory for the required accuracy at a future linear collider. The missing parts of these NLO contributions arise from off-shell top production and decay and other non-resonant irreducible background processes to $t \bar{t}$ production. We consider the total cross section of the $e^+ e^- \rightarrow W^+ W^- b \bar{b}$ process and additionally implement cuts on the invariant masses of the $W^+ b$ and $W^- \bar{b}$ pairs.

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