

Erratum: The collider landscape: which collider for establishing the SM instability?

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ABSTRACT: We correct the beam energy spread of the points shown for the muon collider in figure 4.

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- We replace figure 4 with the following one. In the new figure we have corrected the beam energy spread for the muon collider to correspond to [1].
- In view of the change of performance of the muon collider we correct our discussion on a $\mu^+\mu^-$ top threshold collider. This option could be considered as a possible first stage of a future very high energy muon collider of $E_{\text{cm}} = 10$ TeV or more [2], that is currently being investigated by the International Muon Collider Collaboration (IMCC) [3]. Such ‘First Muon Collider’ was actually proposed long ago [4] (see also [5]).¹ Two parameter sets are proposed in [1]. The first one with energy spread $R = 10^{-4}$ and $\mathcal{L}_{\text{MuC}} = 7 \times 10^{32} \text{cm}^{-2} \text{s}^{-1}$, the second with $R = 10^{-3}$ and $\mathcal{L}_{\text{MuC}} = 6 \times 10^{33} \text{cm}^{-2} \text{s}^{-1}$. The total length L of this collider would be $L = 700$ m. Figure 1 shows that, in one year run, both options could achieve better precision than $\delta M_t = 50$ MeV if systematic uncertainties could be reduced. Notice that the sensitivity of muon colliders (in figure 1) is slightly better than the one of e^+e^- colliders with the same luminosity and energy spread because of the absence of ISR.

¹The uncertainty estimated in [4] for 100fb^{-1} is in good agreement with ours, taking into account that a $t\bar{t}$ efficiency $\epsilon = (0.3)^2$ (much lower than the realistic $\epsilon = 0.7$ [6] we employ) is assumed in [4]. Furthermore, the NNNLO cross-sections we employ give better sensitivity than the ones at NLO used in [4].

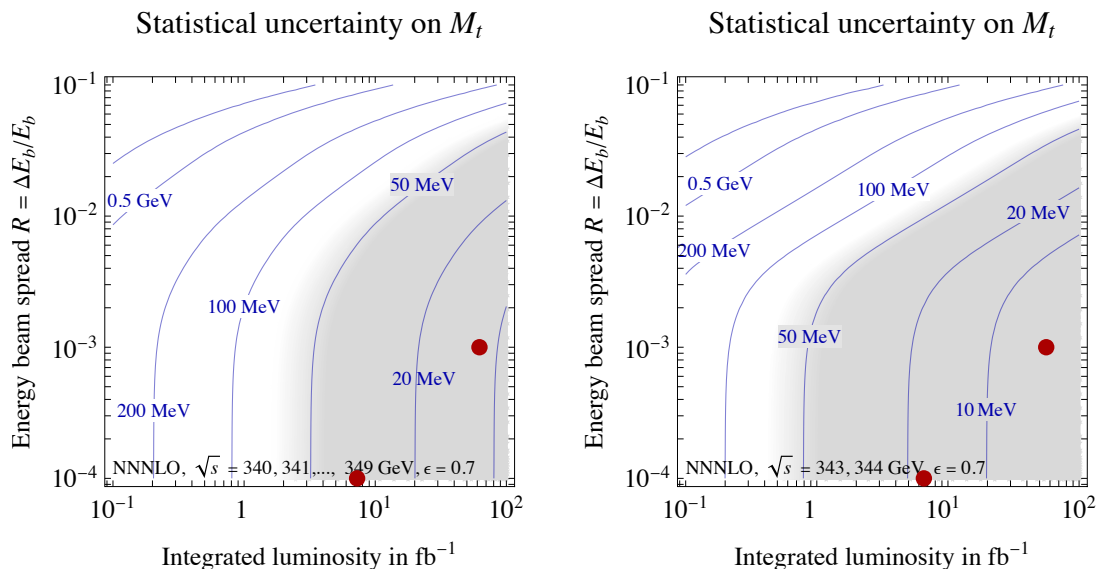


Figure 1. *Statistical uncertainty on the top mass.* Initial State Radiation is neglected, as appropriate for a muon collider. The left panel assumes running at 10 values of $E_{\text{cm}} = \{340, 341, \dots, 349\}$ GeV with $\mathcal{L}/10$ luminosity at each point. The right panel assumes running at $E_{\text{cm}} = \{342, 343\}$ GeV with $\mathcal{L}/2$ luminosity at each point. The results are reported in the plane formed by the beam energy spread R , and the luminosity \mathcal{L} . We assumed a 70% efficiency for $t\bar{t}$ reconstruction. In the shaded region the systematic uncertainty on M_t estimated in eq. (3.3) is larger than the statistical uncertainty.

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