

CP Violation in Charged Higgs Production

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2 December 2004

Structure ...

- Introduction
- Decay
- Production
- Work in Progress

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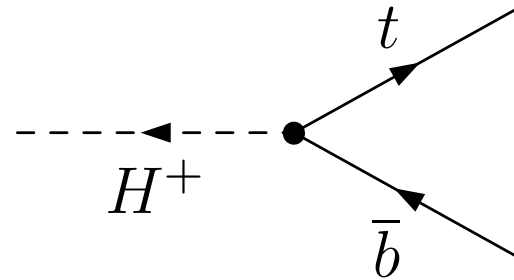
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- Choose to investigate A_t , keeping other phases zero.

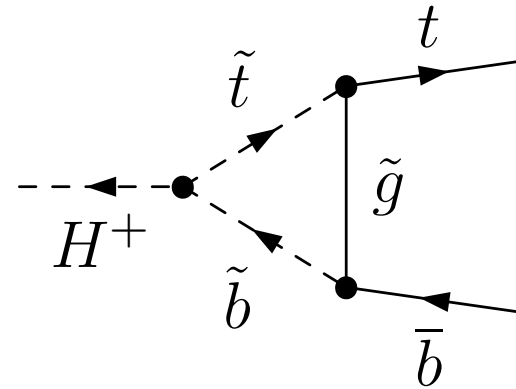
The Process

- CP violation in loop correction to tbH^\pm vertex.



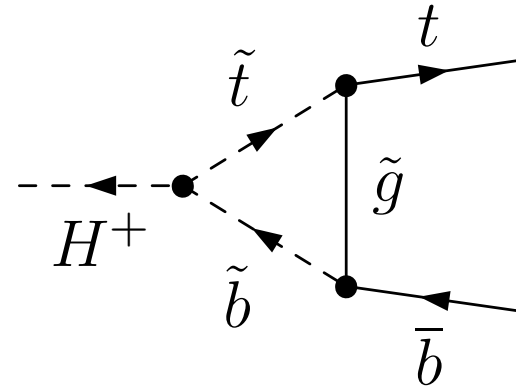
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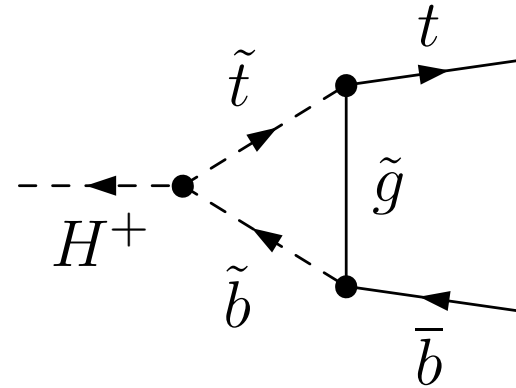
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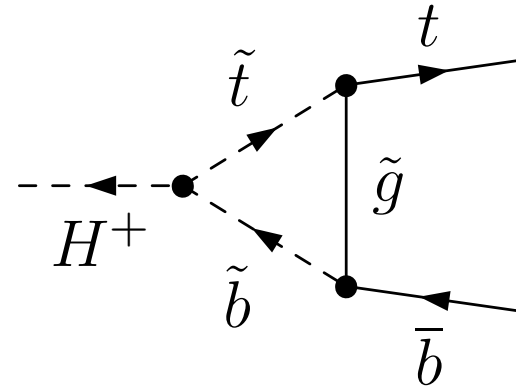
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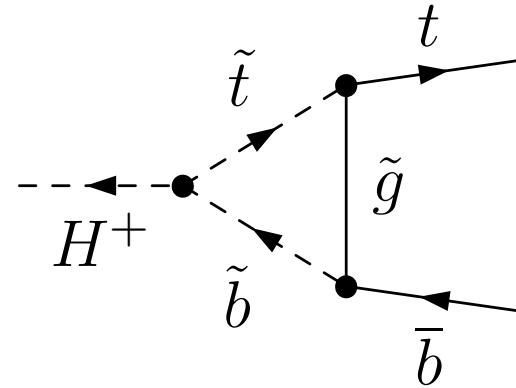
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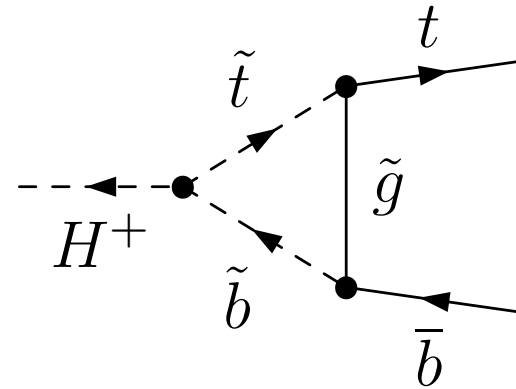
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- Calculate CP asymmetry:

$$\mathcal{A}_{CP} = \frac{\sigma(H^+) - \sigma(H^-)}{\sigma(H^+) + \sigma(H^-)}$$

The Decay

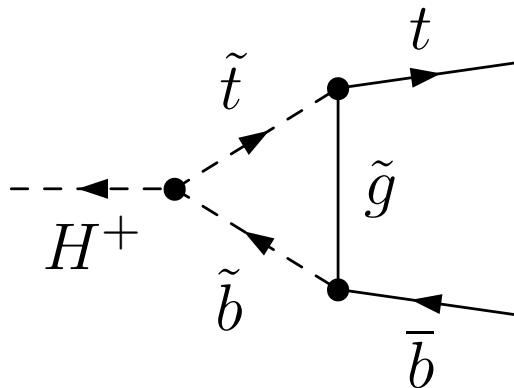
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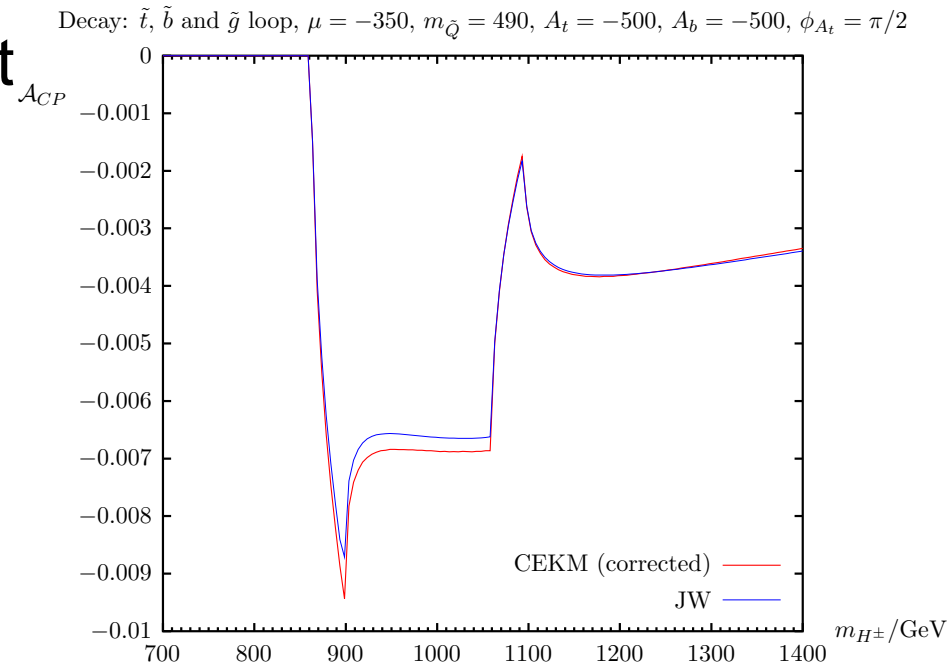
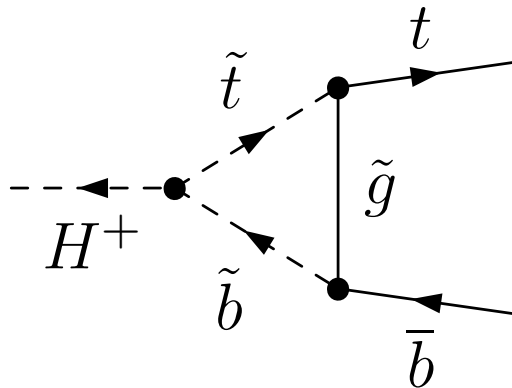
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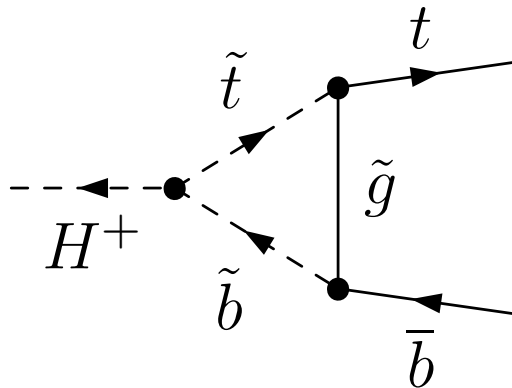
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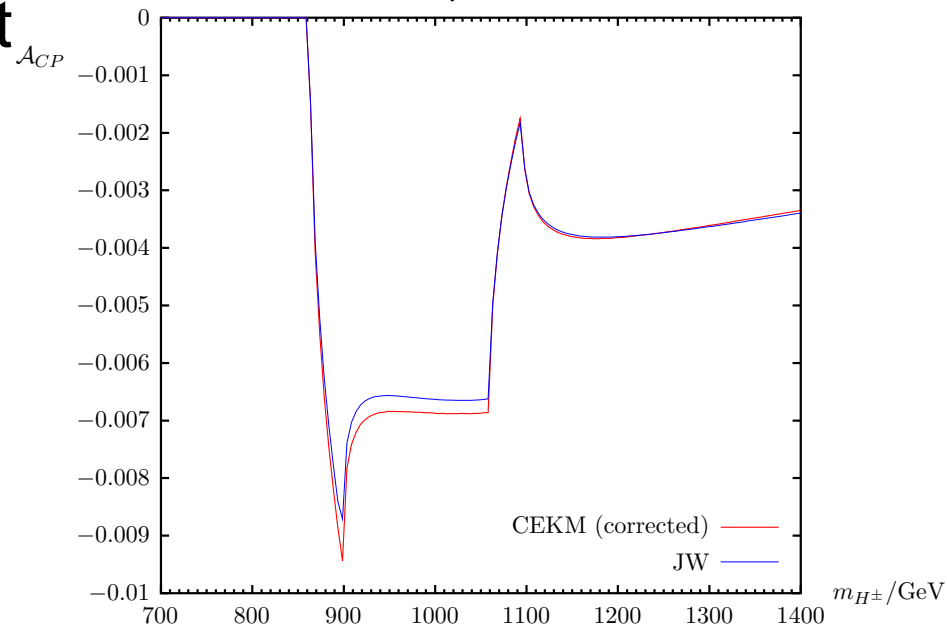


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Decay: \tilde{t}, \tilde{b} and \tilde{g} loop, $\mu = -350, m_{\tilde{Q}} = 490, A_t = -500, A_b = -500, \phi_{A_t} = \pi/2$



- Result is less asymmetry than in other study.

Production

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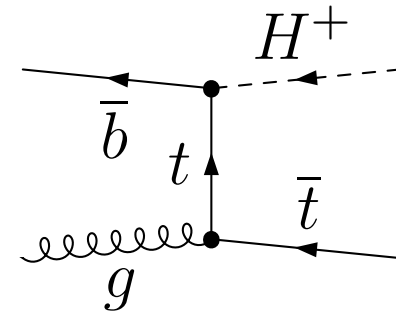
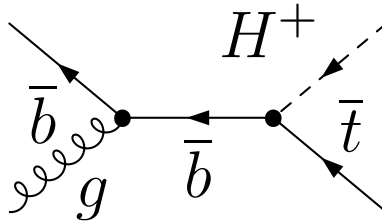
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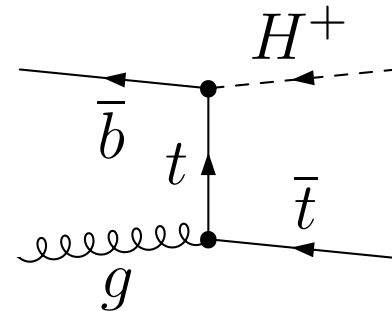
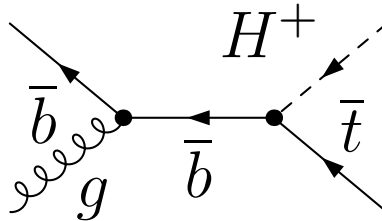
Bottom – gluon
fusion:



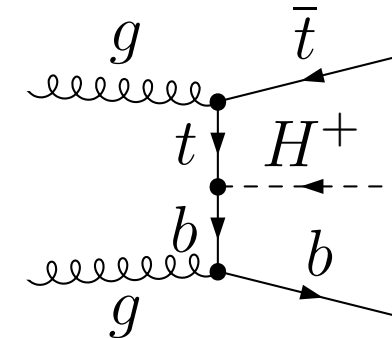
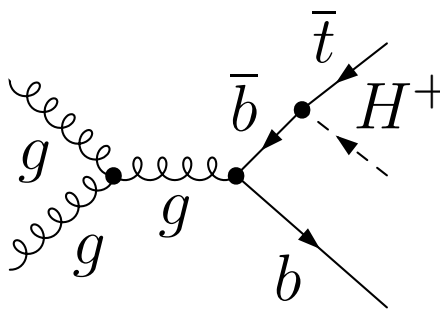
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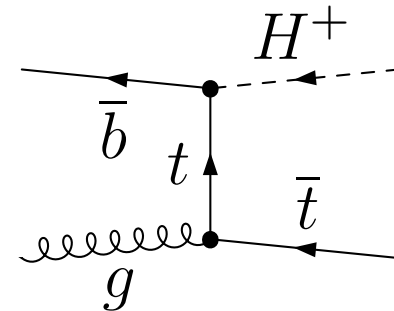
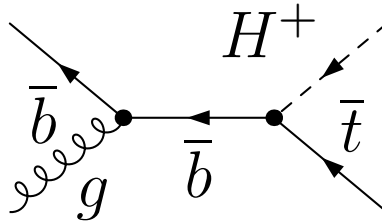
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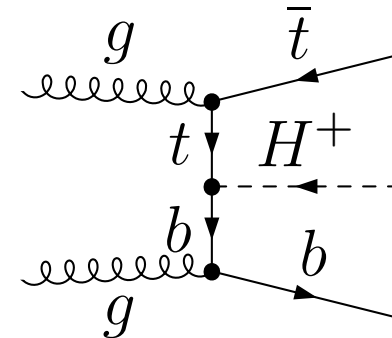
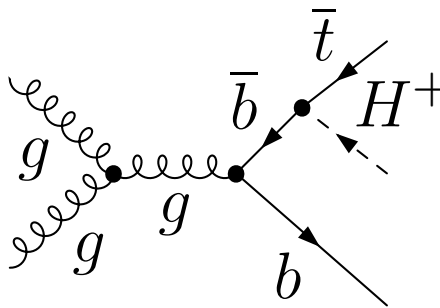
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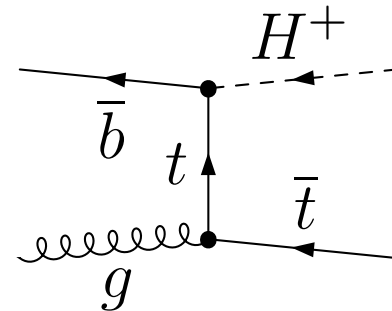
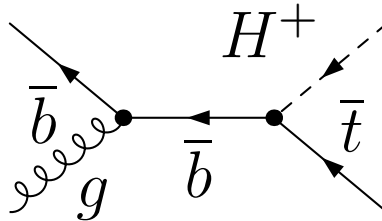


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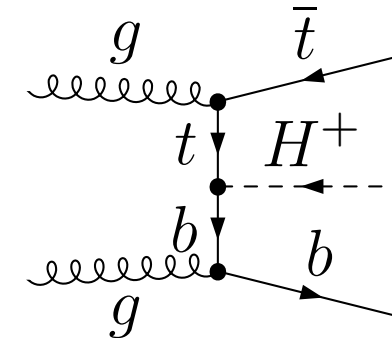
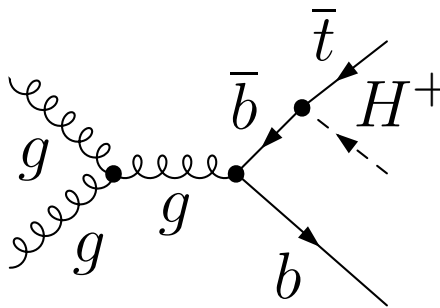
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- Dominant process is bottom – gluon fusion.
- Need to take care when combining to avoid double counting.

Production

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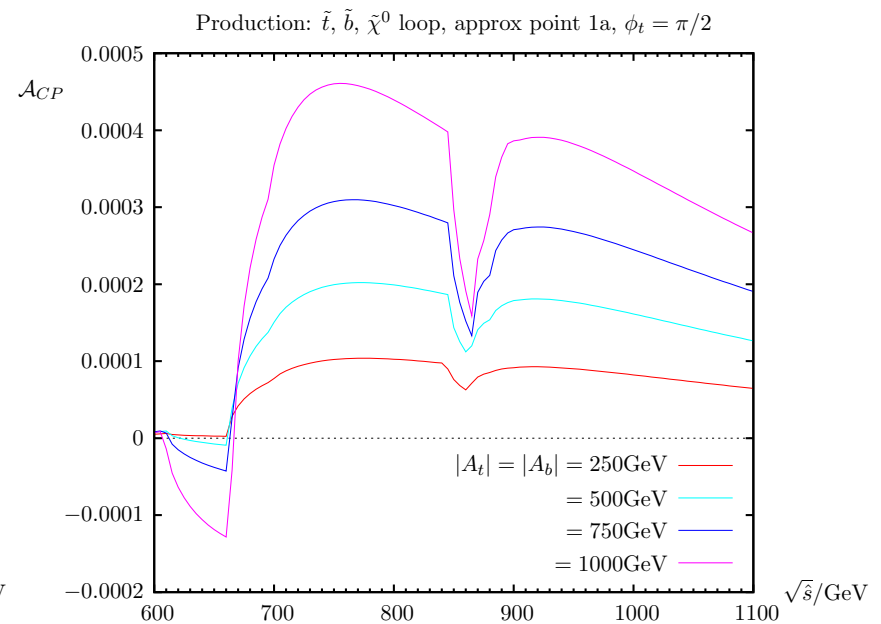
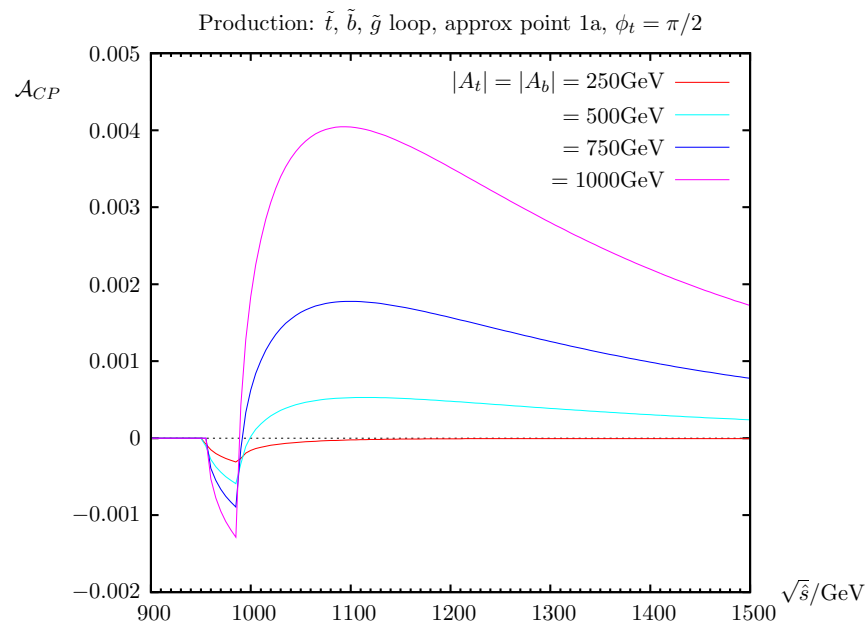
Comput. Phys. Commun. **118** (1999) 153

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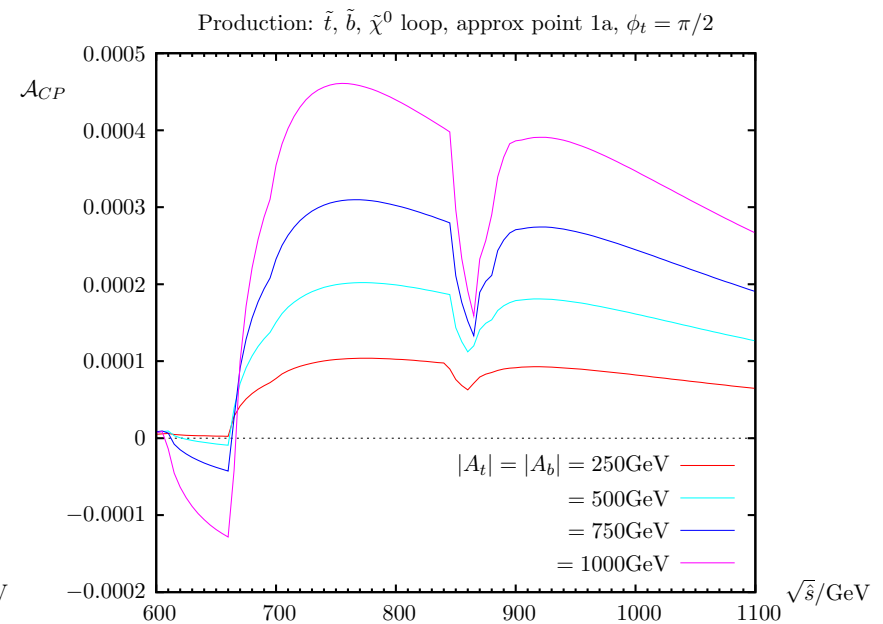
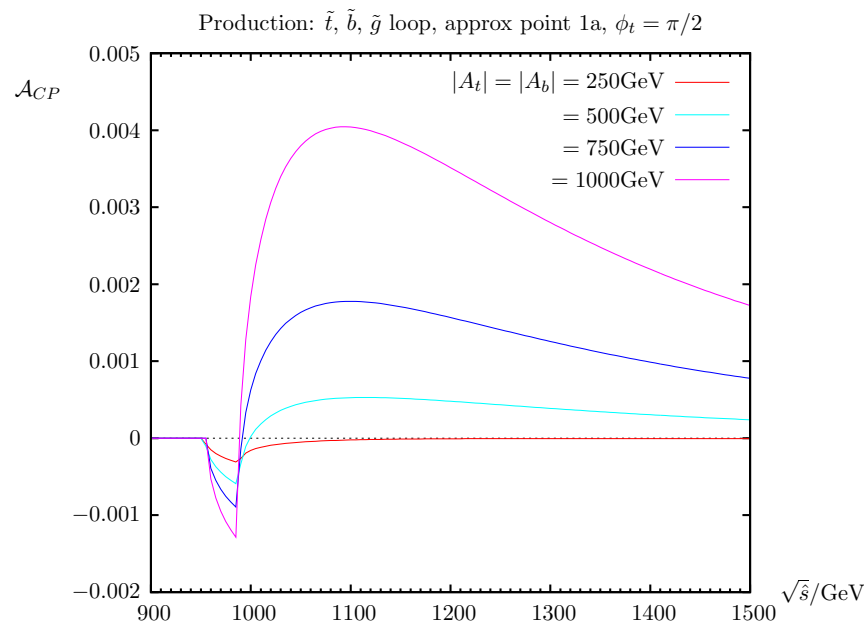


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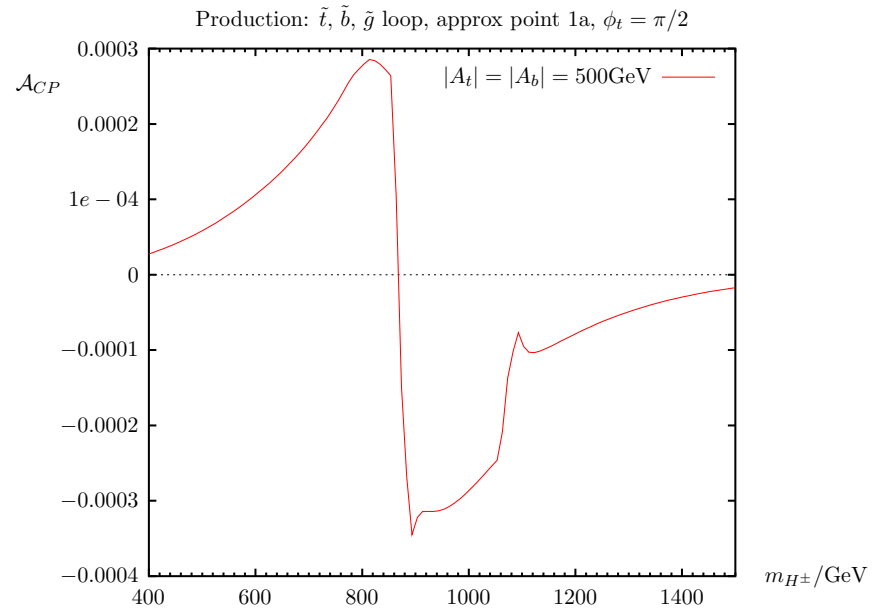
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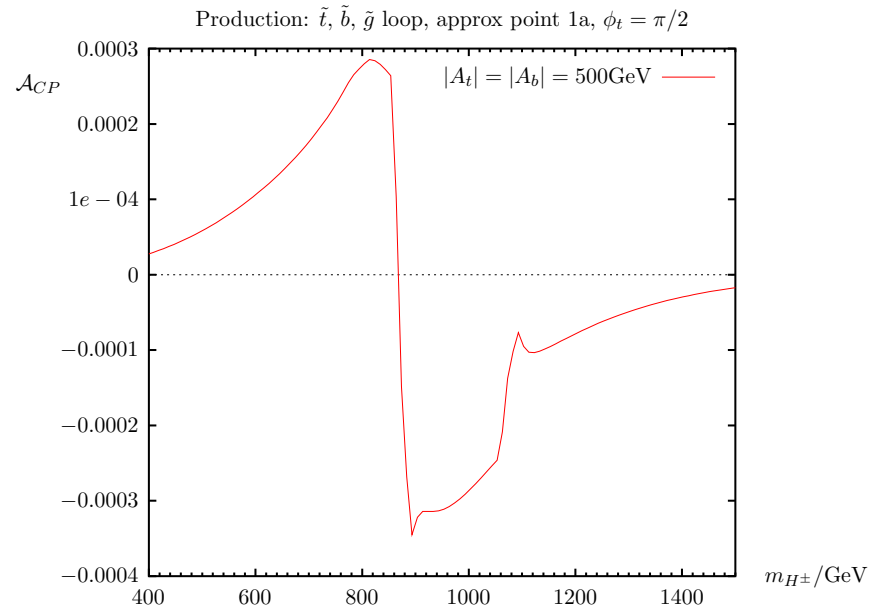
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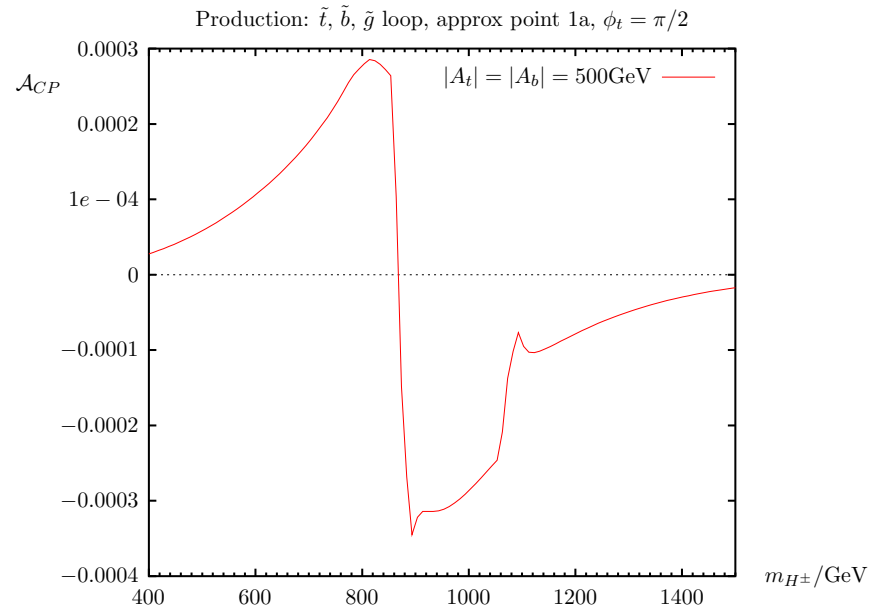
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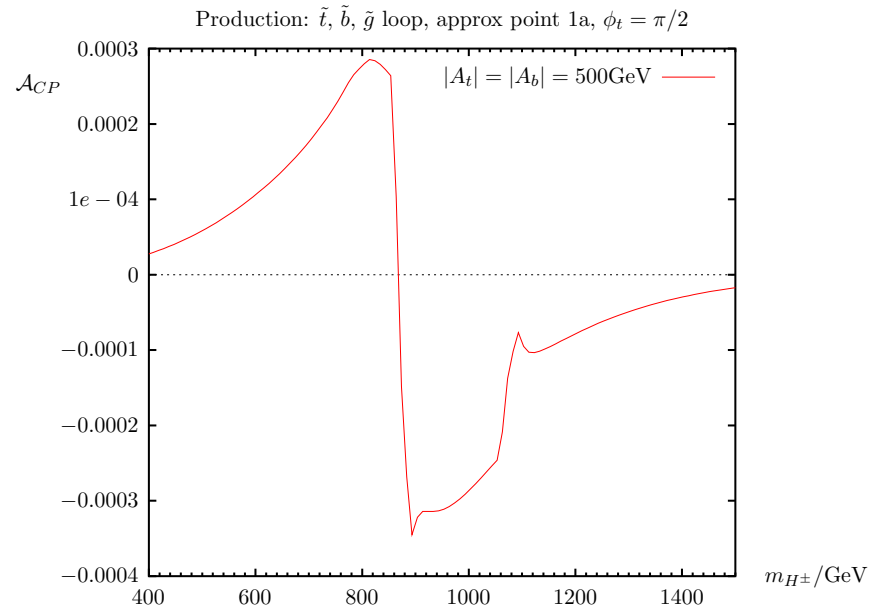


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- Not looking promising! Probably need to wait for luminosity upgrade.

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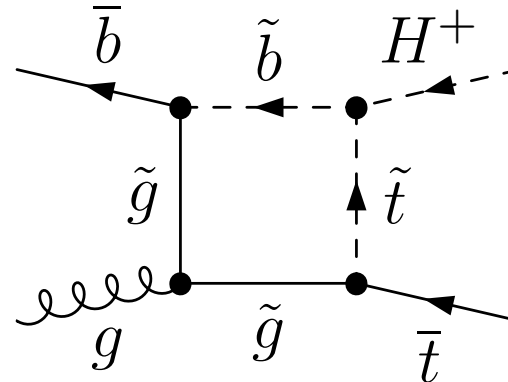
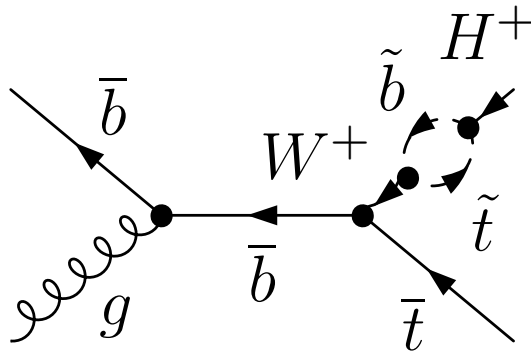
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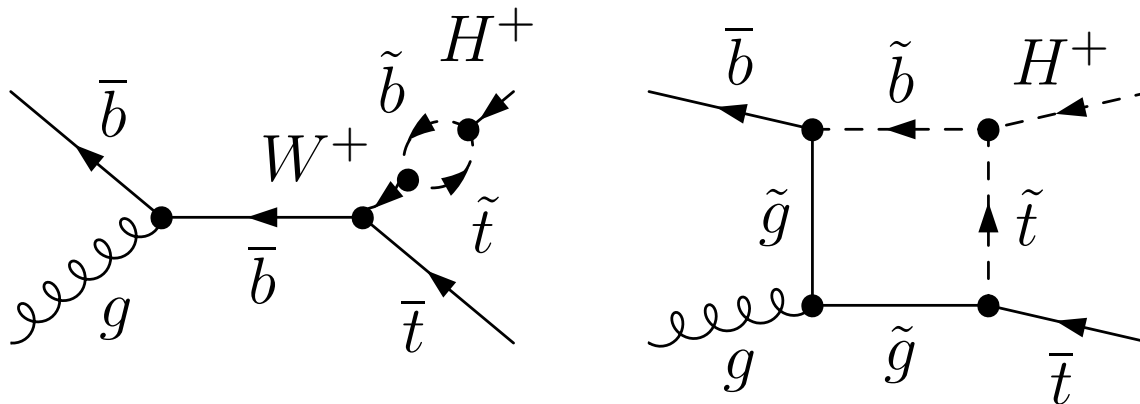
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- Explore possibilities at International Linear Collider — cleaner environment