

# Role of quark-mass corrections in pQCD

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# Introduction

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- **Disclaimer: Personal selection of “recent developments”**

**Mainly selected to pass some sort of message through**

# Introduction

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- **No magical recipe to deal with HQ:**

**The way you do it depends on quite a few things (Observables, CoM Energy,  $m_Q, \dots$ )**

- **The general consensus seems to be that for LHC applications  
Mass corrections are usually small...**

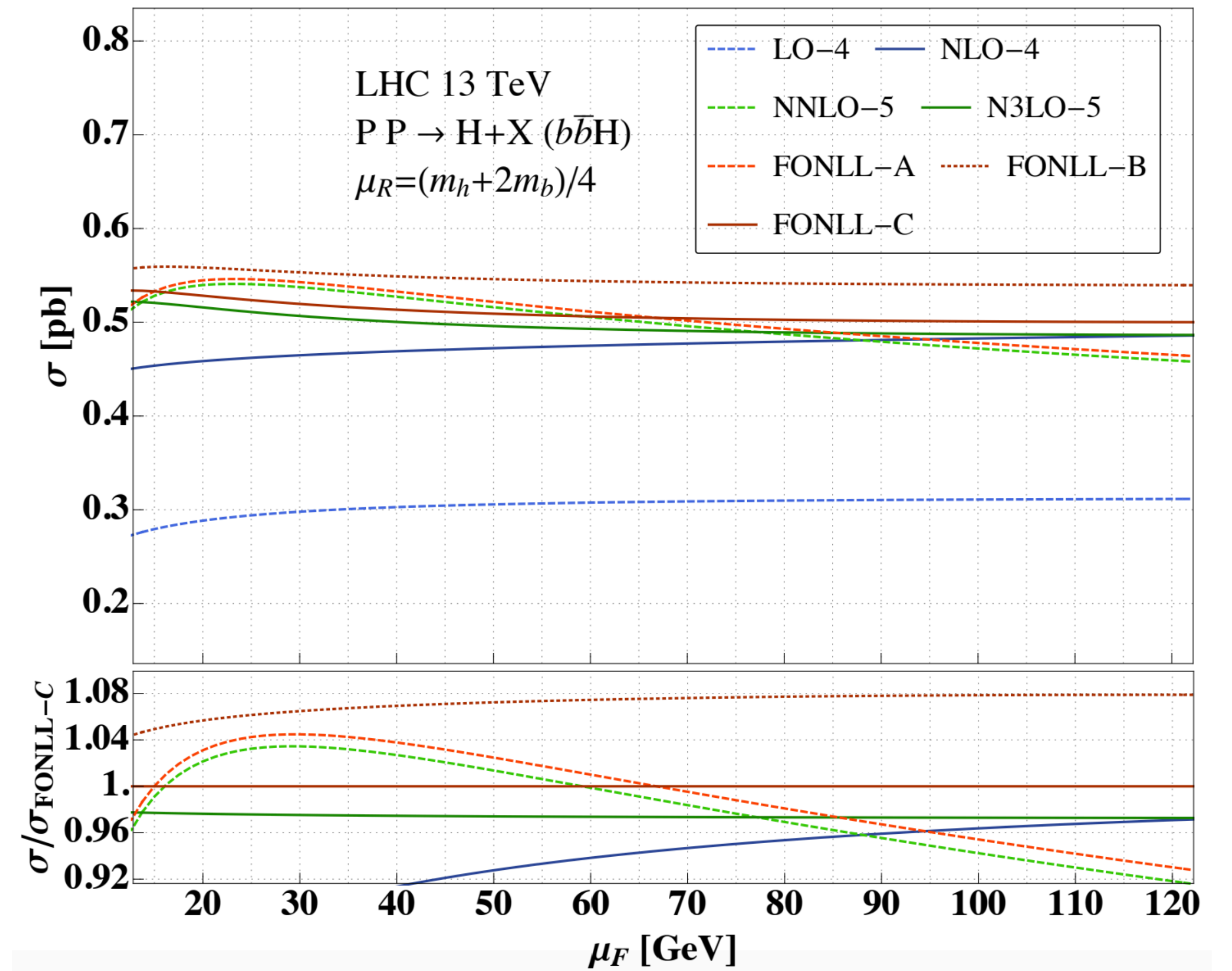
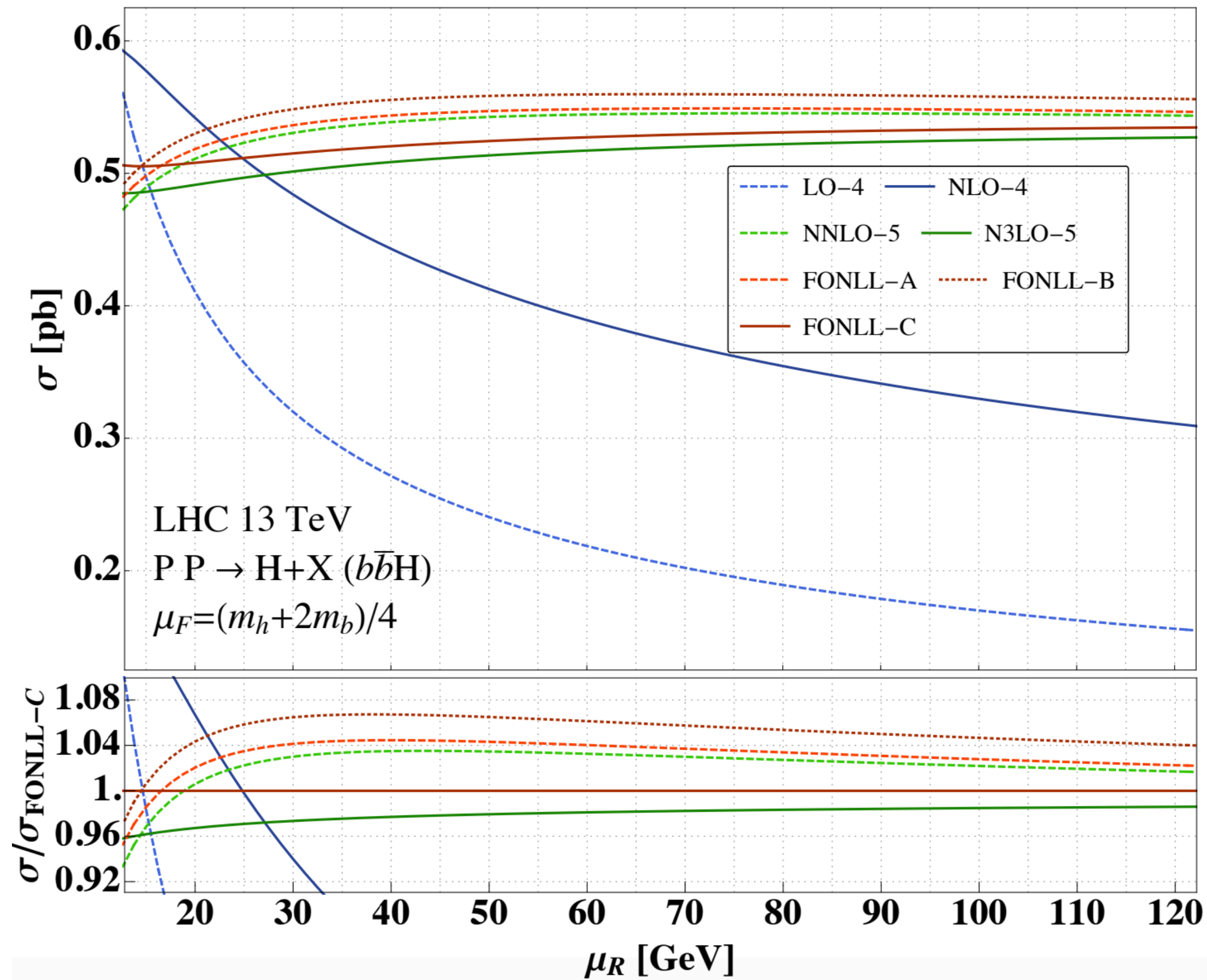
# Introduction

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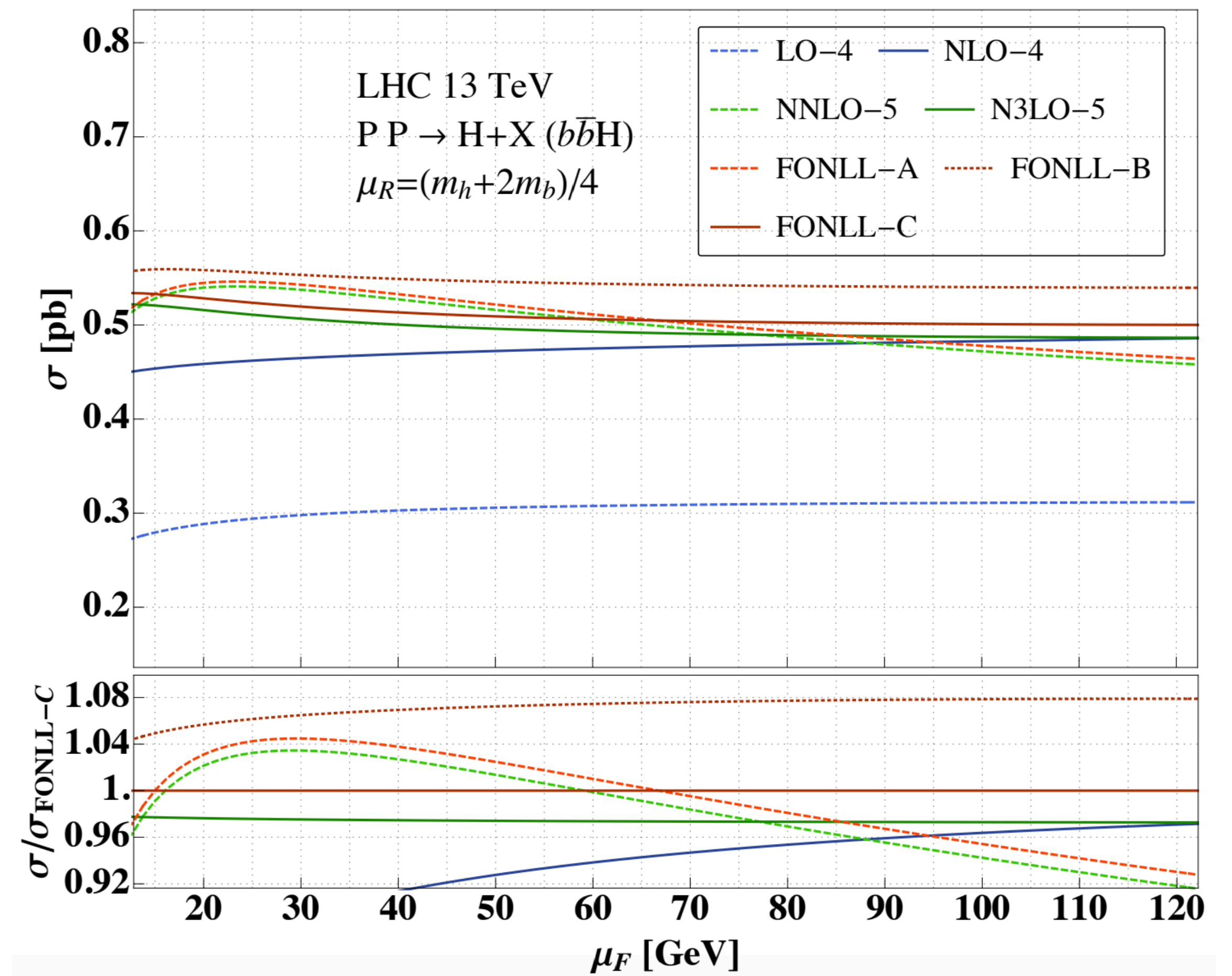
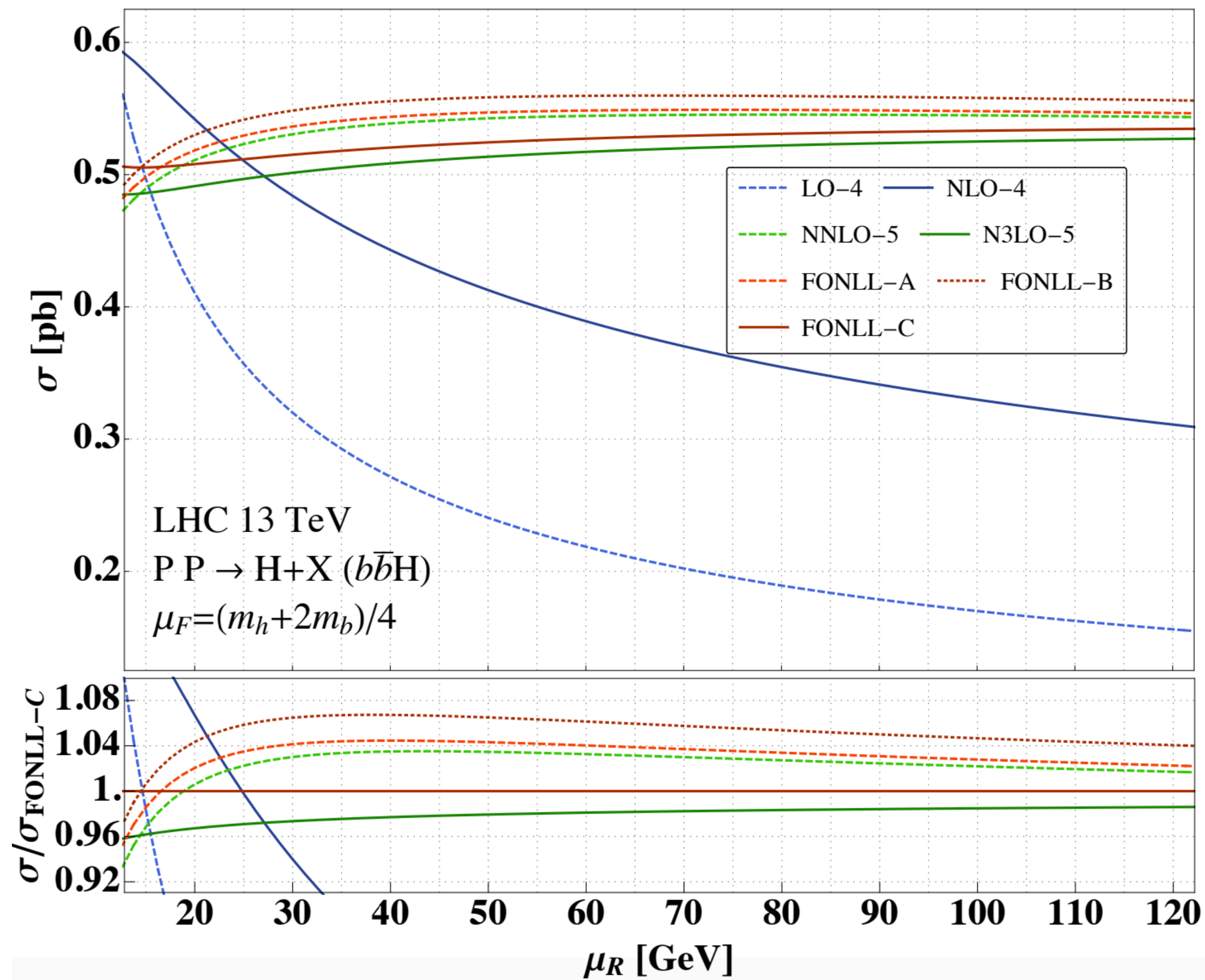
**The way you do it depends on quite a few things (Observables, CoM Energy,  $m_Q, \dots$ )**

- **The general consensus seems to be that for LHC applications  
Mass corrections are usually small... **However ...****



$$\text{FONLL} = 5F + 4F - 4F, 0$$

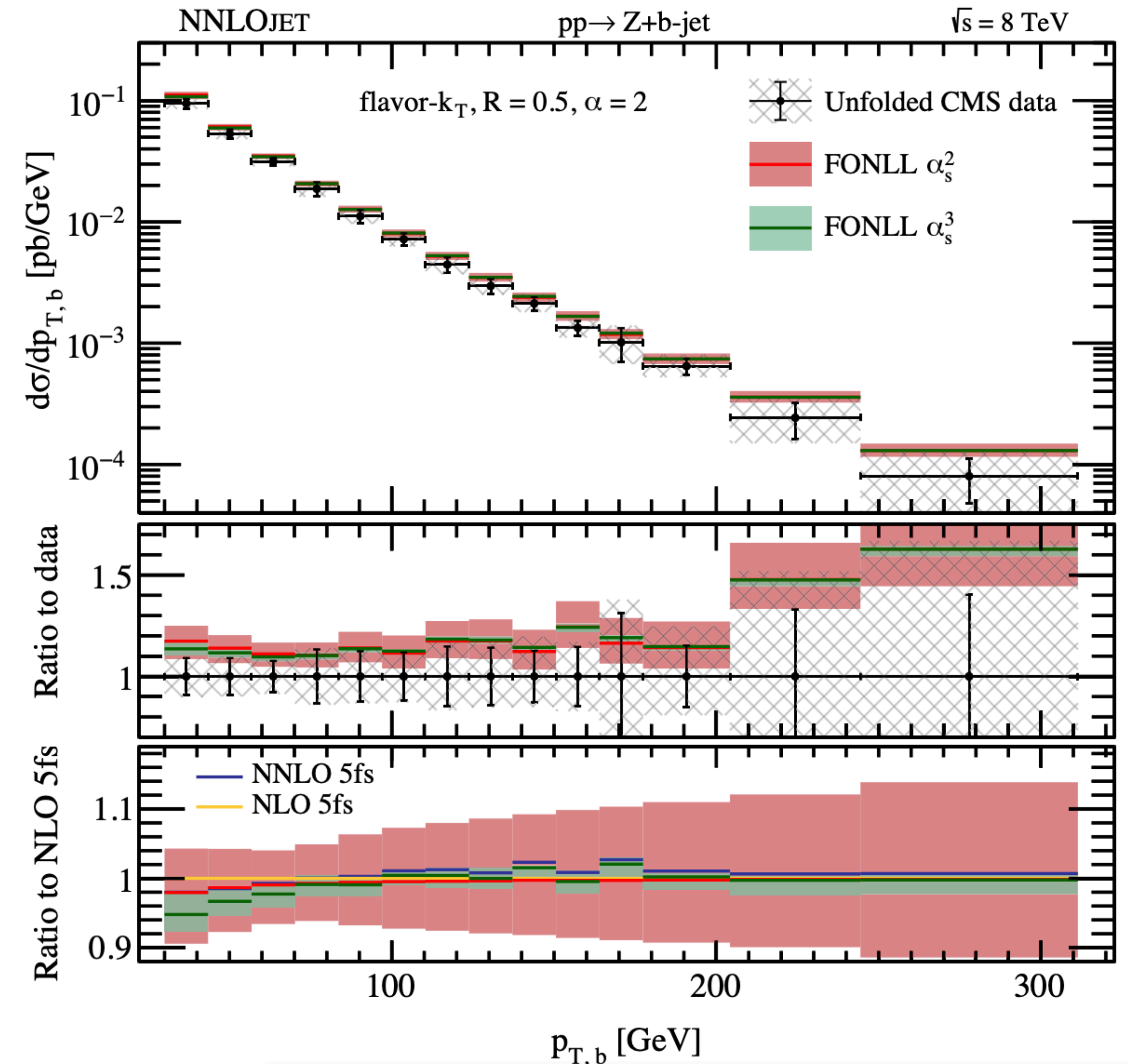




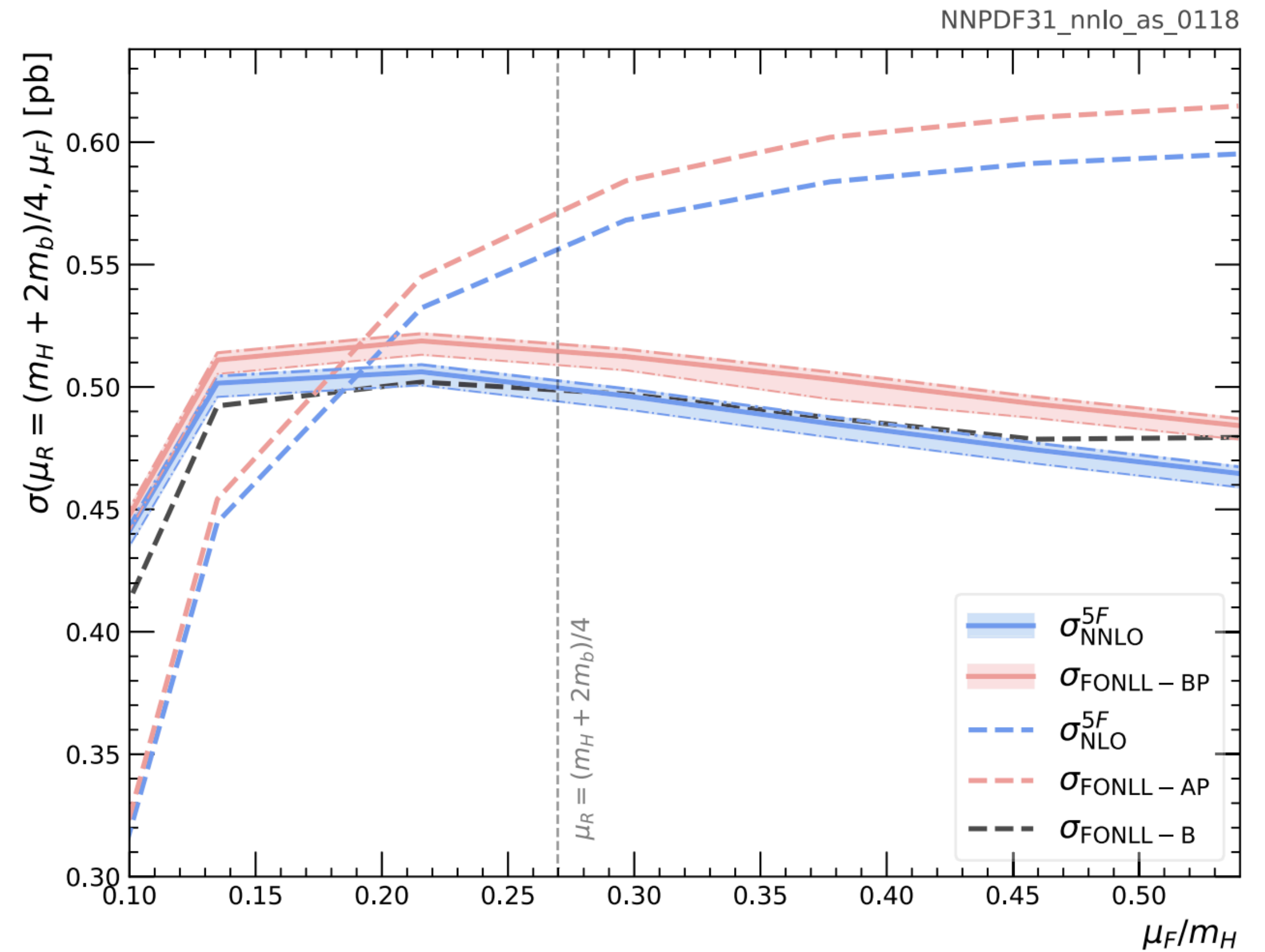
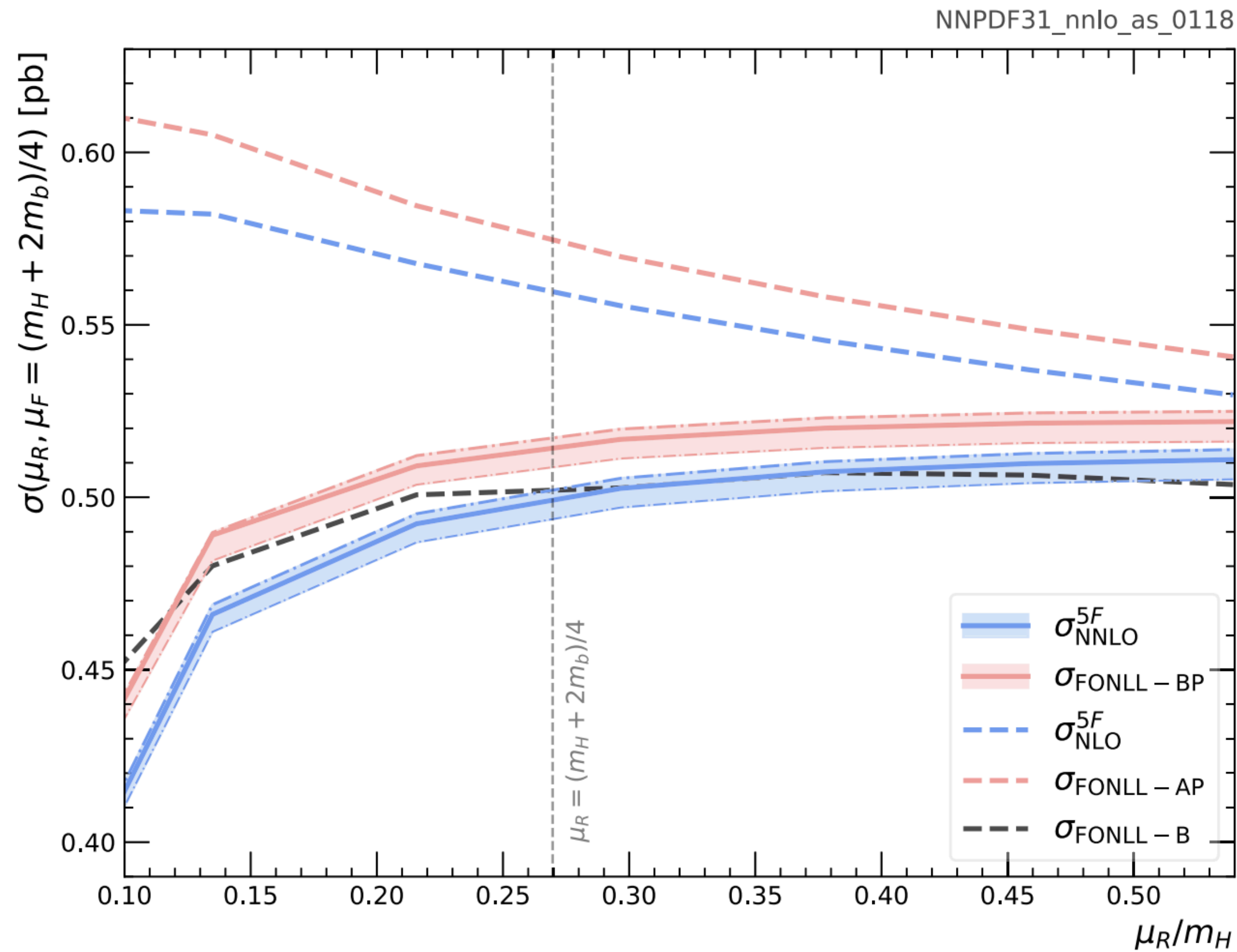
FONLL - 5F not abs large, but to be compared with the ~ 1% scale var..

## Similar level of outstandingness

- Differential FONLL, at high order
- When relevant, mass corrections are found to be similar to the inclusive case

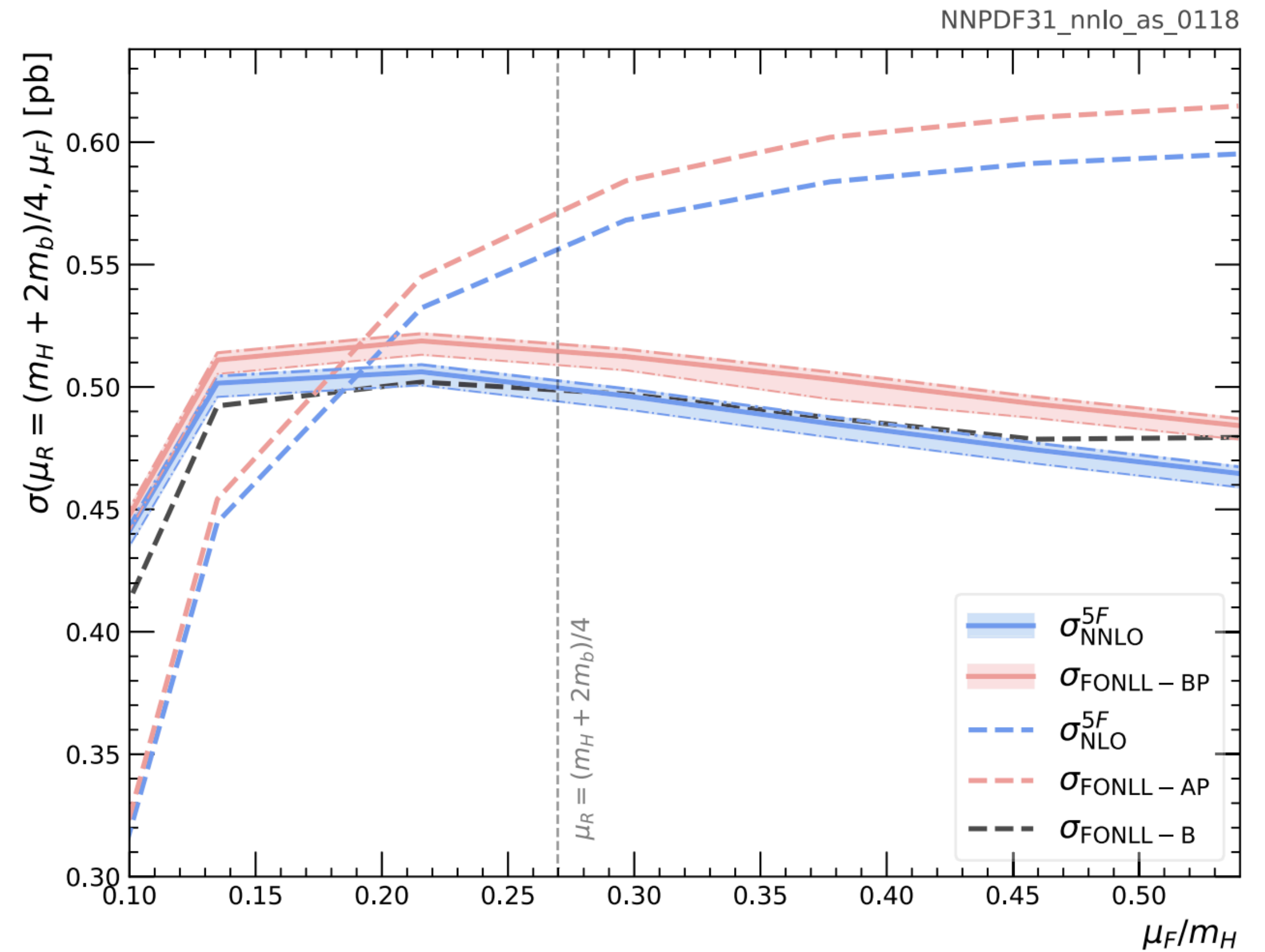
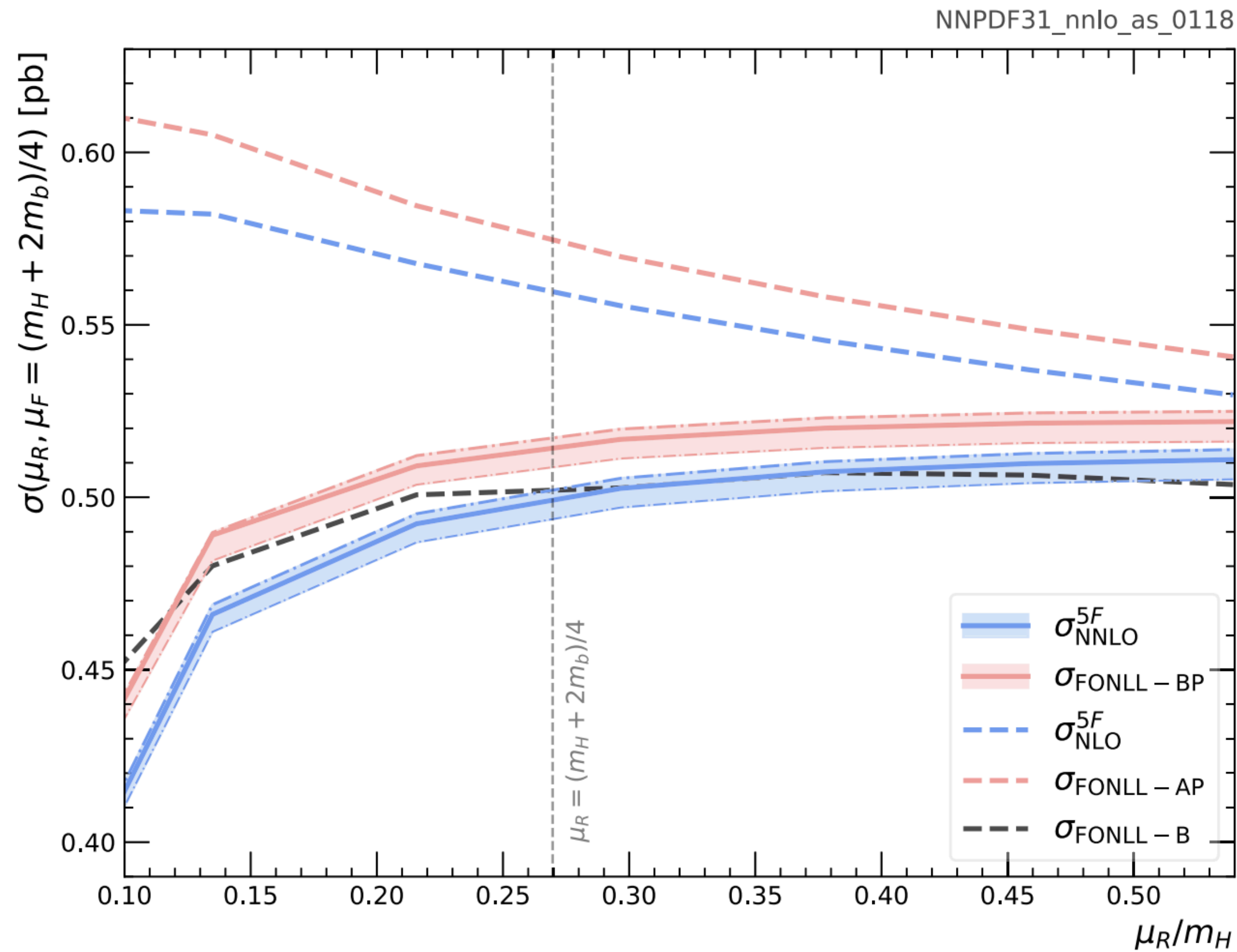






- **Massive 5F scheme as in** Krauss, DN *Phys.Rev.D* 98 (2018) 9, 096002 , Figueroa et al *Phys.Rev.D* 98 (2018) 9, 093002 **is equivalent to FONLL-AP**
- **Intrinsic in this context, simply means**  $\mu_b < m_b$





- Mass effects roughly same size, but (relative) huge difference with FONLL-B
- => large dependence on  $\mu_b$  (should be expected!)

# Conclusions

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- **Mass effects typically small, but sizeable at the LHC**
- **To include them or not to include them, and how?**
- **Most of these effects (at least in the initial state) seem to originate from the b-PDF**

# Conclusions-2

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- **Not included in this talk:**

- \* **Differential Multi-Jet Merging (the net effects are and should be the same!)**

Höche, Krause, Siebert *Phys.Rev.D* 100 (2019) 1, 014011

- \* **Shower effects: Evolution schemes / Power corrections**