The Problem of Overlapping Formation Times

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Peter Arnold and Shahin Iqbal arXiv:1806.08796 [hep-ph]

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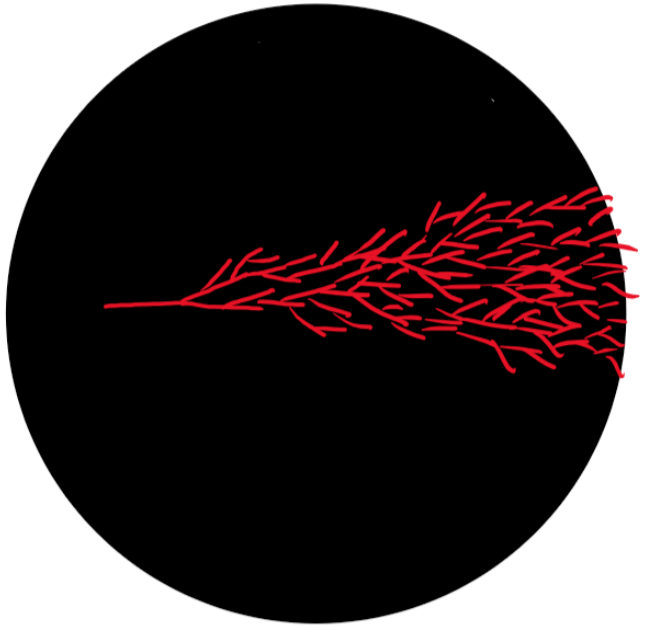
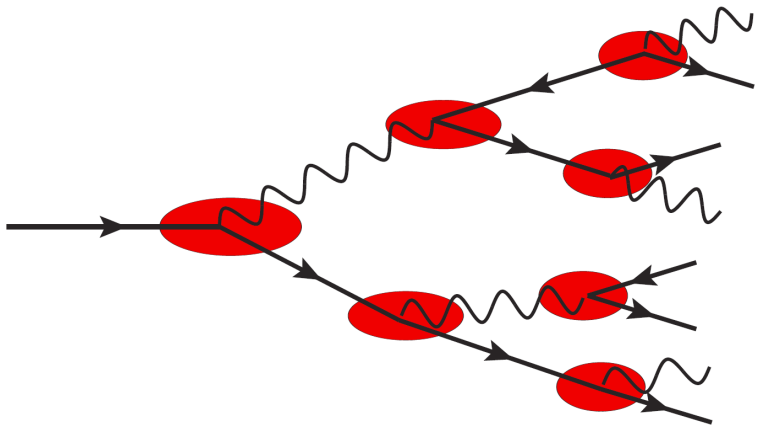
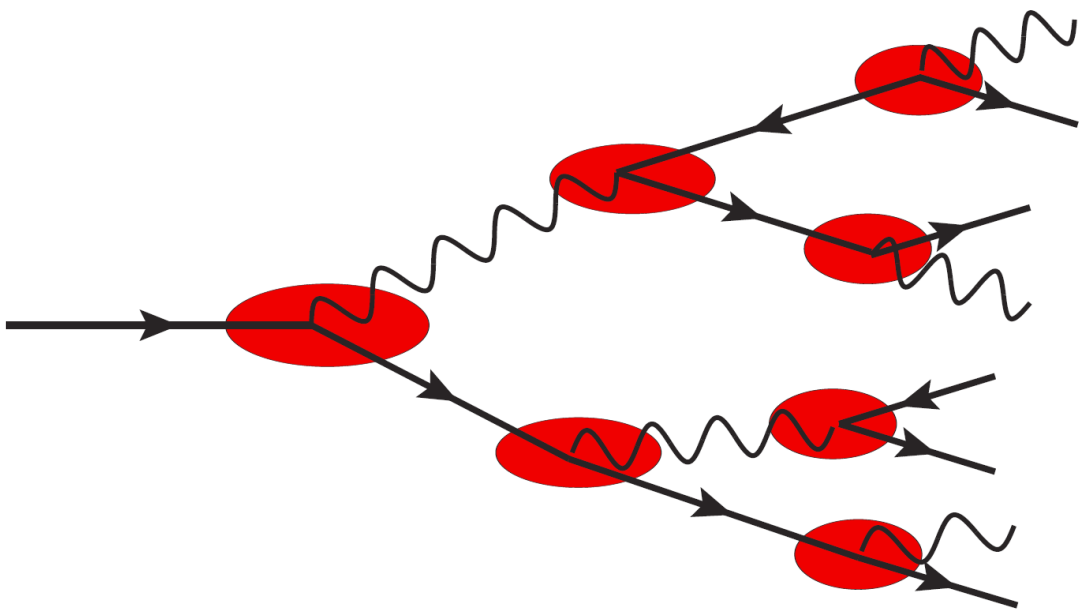
Formation time



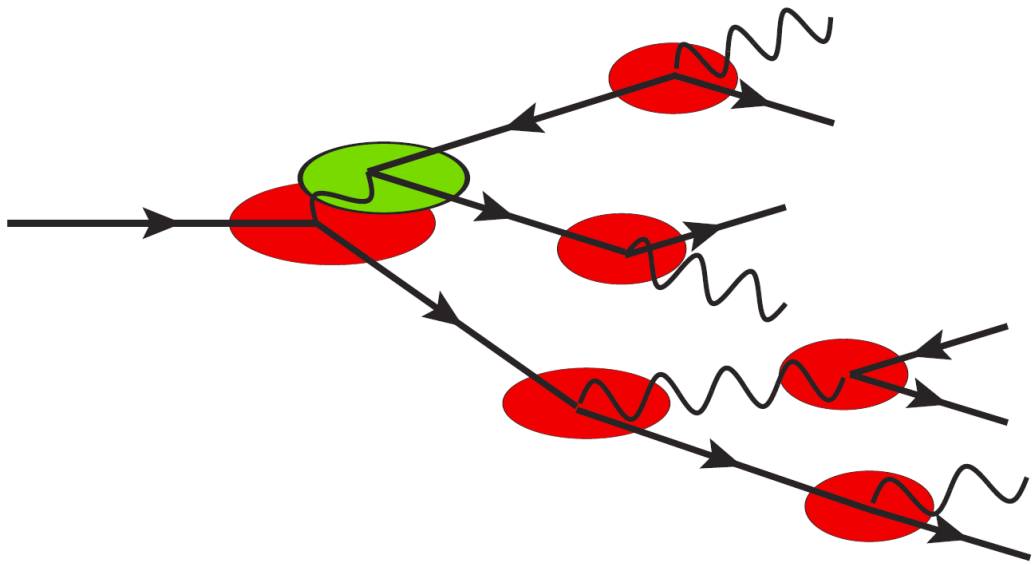


Are consecutive emissions independent?



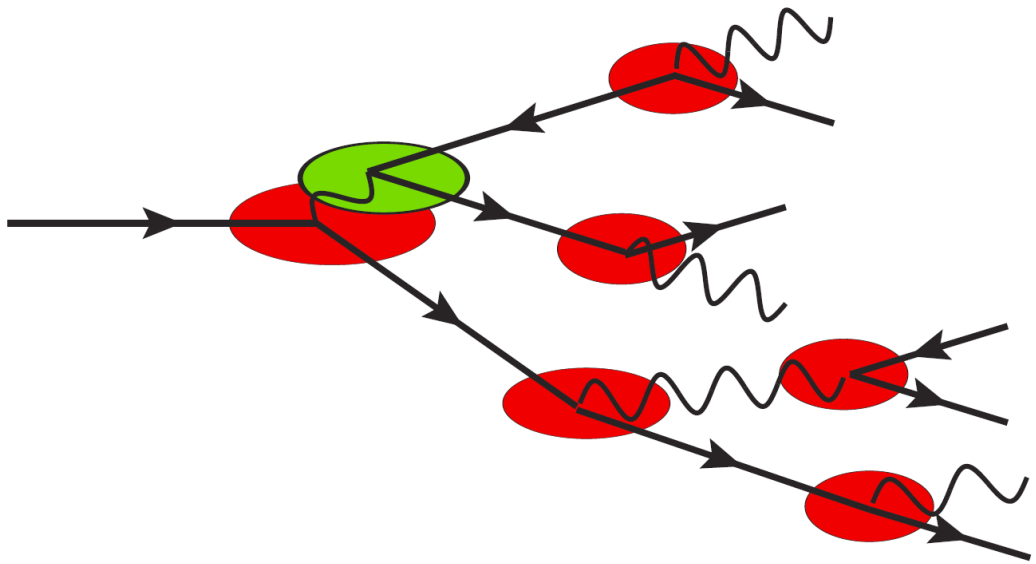
Yes!

Are consecutive emissions independent?



No!

Are consecutive emissions independent?

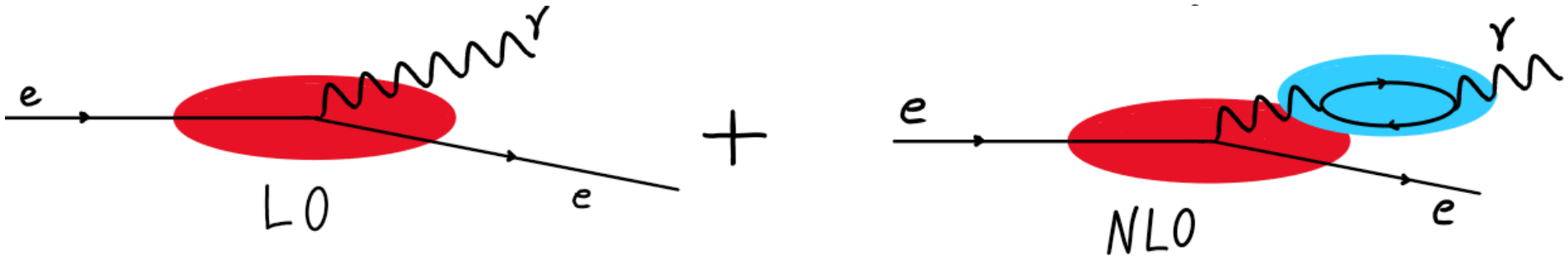


No!

Corrections parametrically of the order of coupling constant $\alpha(Q_T)$.

We calculate:

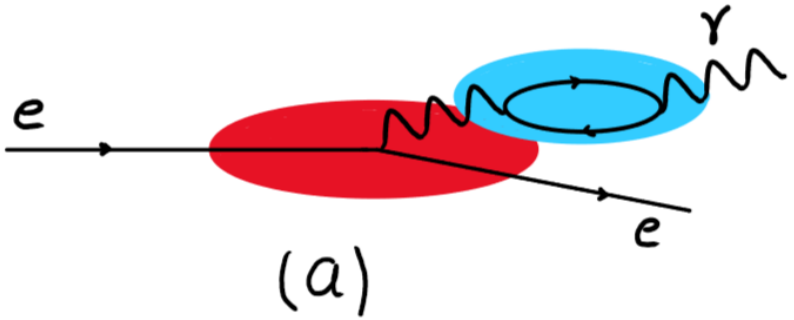
1- Overlap corrections to bremsstrahlung rate.

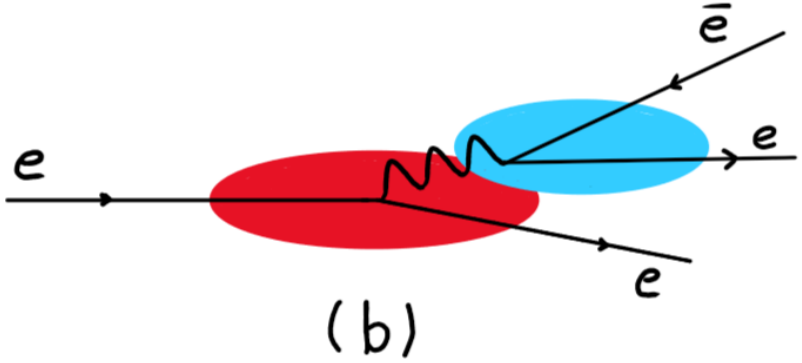


$$\left[\frac{d\Gamma}{dx_e}\right]^{NLO} = -\frac{N_f \alpha_{EM}}{6\pi}\left[\frac{d\Gamma}{dx_e}\right]^{LO} \log\left(\frac{x_e \mu^4}{(1-x_e)^3 \hat{q} E}\right) + (\text{Stuff})$$

We Calculate:

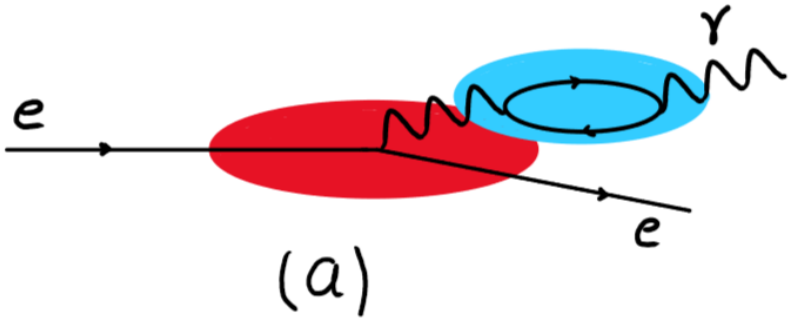
2- Overlap corrections to electron stopping length.

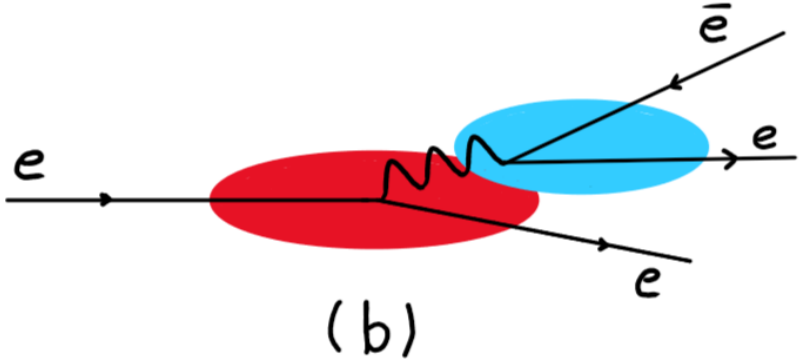




What we find?

Overlap effects ***enhance*** energy loss and ***reduce*** stopping distance.

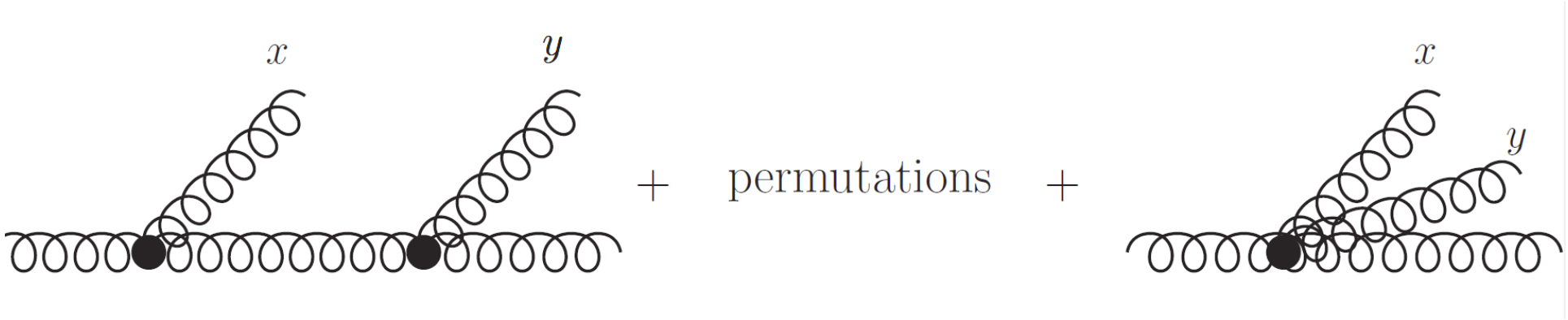




$$\frac{\Delta l_{stop}}{l_{stop}} = -1.28 N_f \alpha_{EM} \left((\hat{q}E)^{1/4} \right)$$

Thank You

We calculate overlap corrections



Overlap effects for real, double gluon bremsstrahlung in Large-Nc QCD.