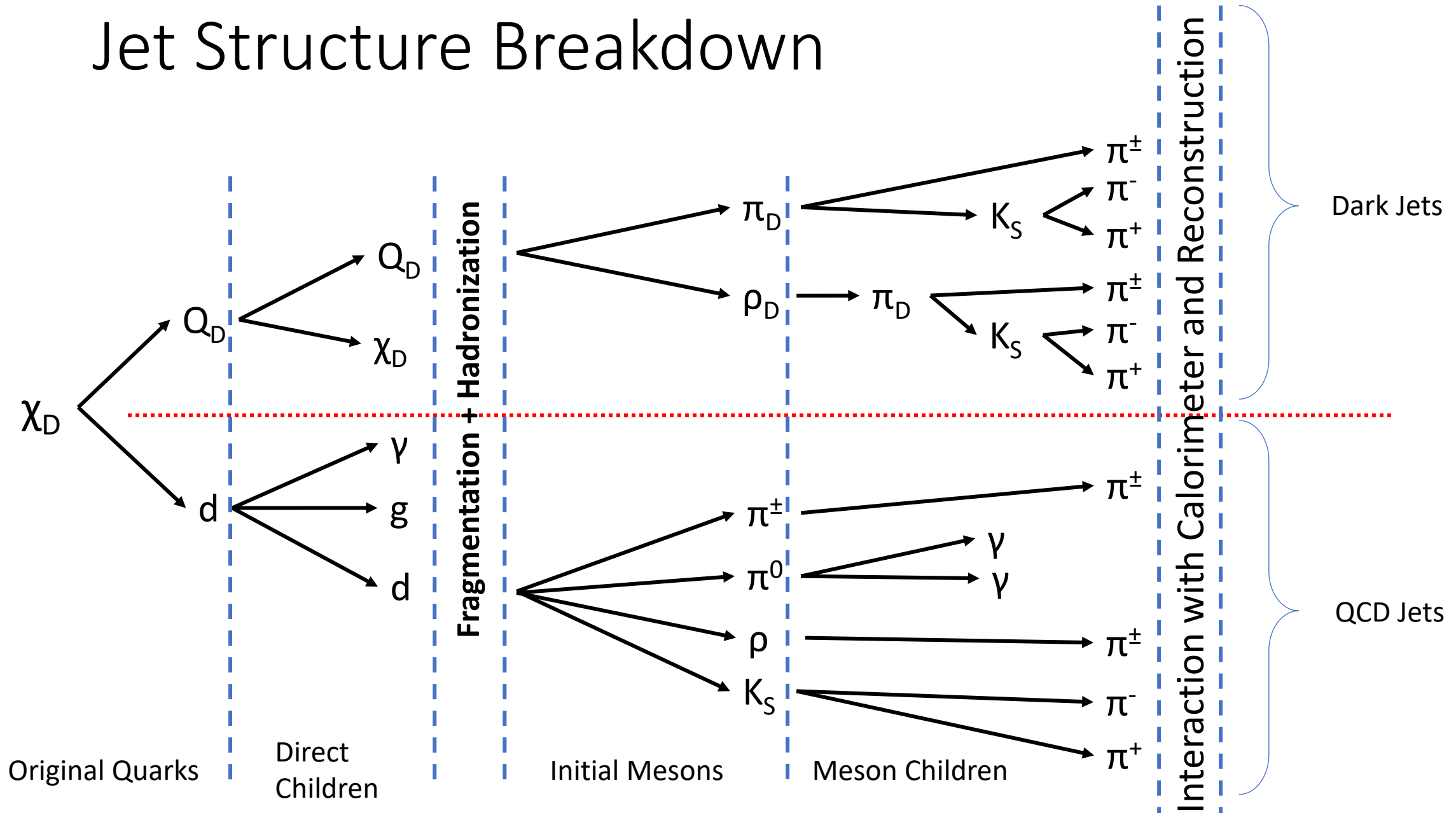


ΔR Jet Reconstruction

July 23, 2020

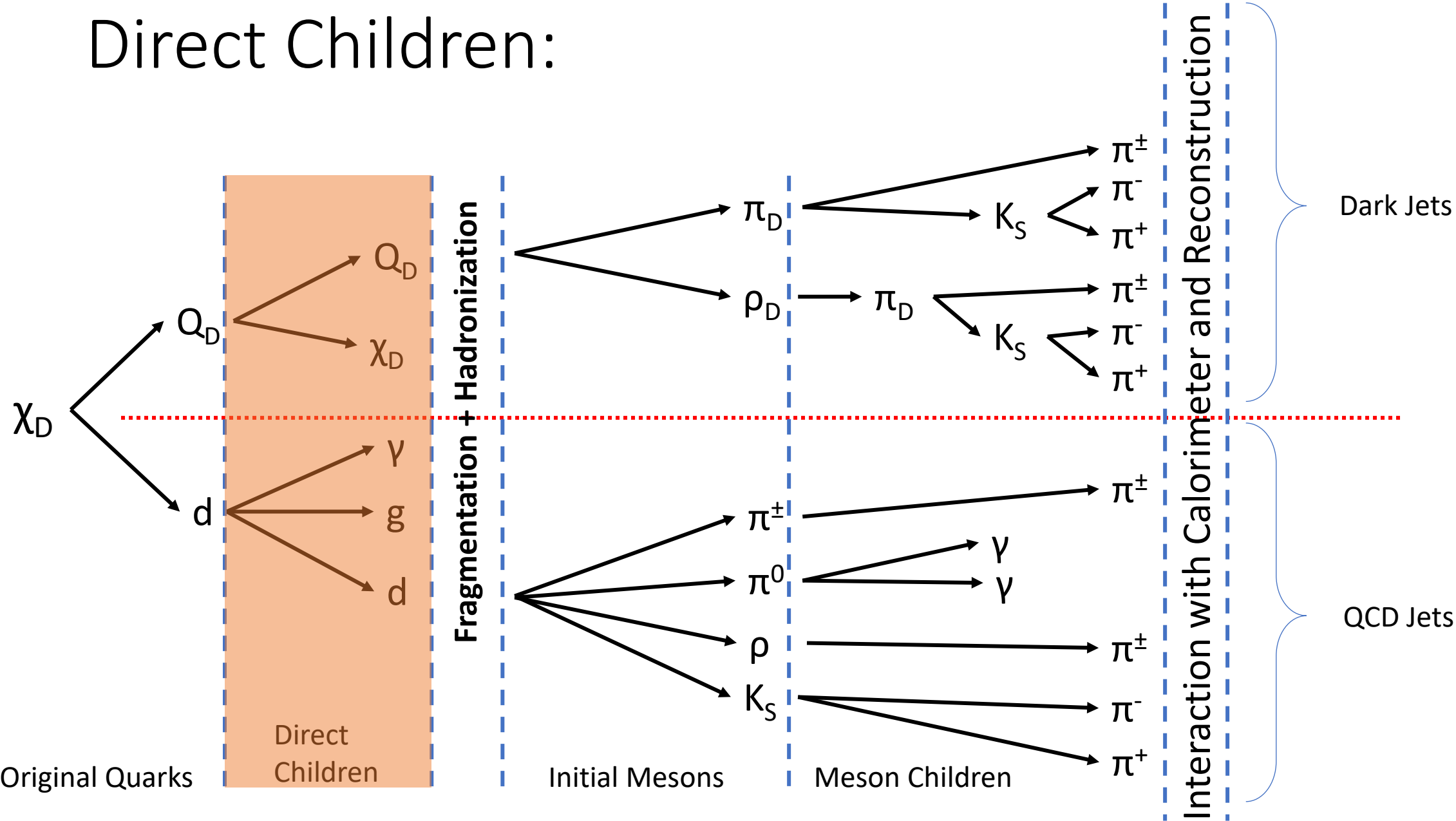
Jet Structure Breakdown



Definitions:

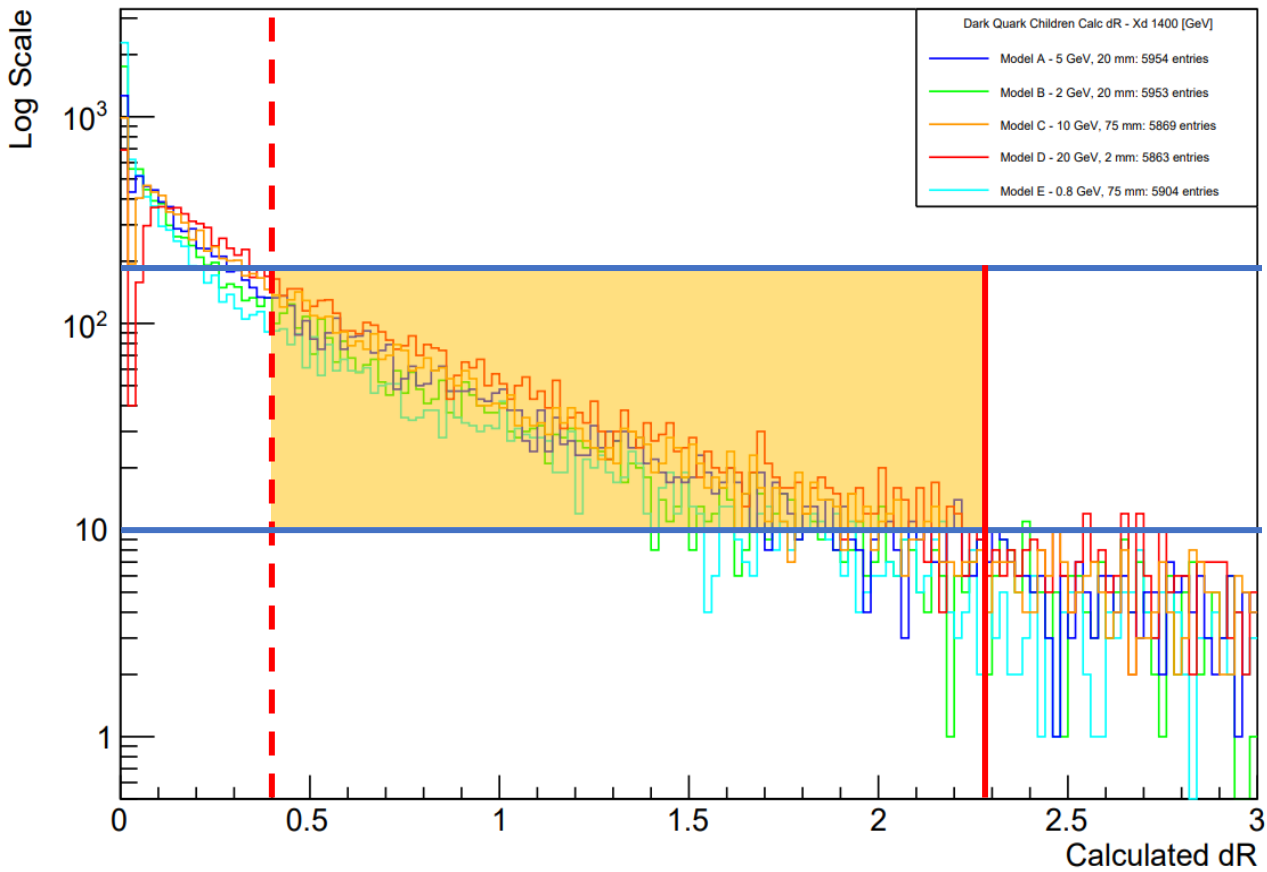
- Original Quarks:
 - truthPart_pdgId = 1 (down) or 4900101 (dark)
 - truthPart_status = 23 (involved in hardest subprocess)
- Direct Children:
 - truthPart_parent_pdgId = 1 or 4900101
 - truthPart_parent_pdgId = 23
- Primary Dark Mesons:
 - truthPart_pdgId = 4900211 (pion) or 4900213 (rho)
 - TruthPart_status = 83 or 84 (involved in the primary hadronization process)
- Primary QCD Mesons:
 - truthPart_pdgId = 211 (pion), 111 (neutral pion), 213 (rho), or 310 (Kshort)
 - TruthPart_status = 1 or 2 (stable or generator stable)
- Dark Meson Children:
 - truthPart_parent_pdgId = 4900211 or 4900213
 - TruthPart_parent_status = 83 or 84
- QCD Meson Children:
 - truthPart_parent_pdgId = 211, 111, 213, or 310
 - TruthPart_parent_status = 1 or 2

Direct Children:

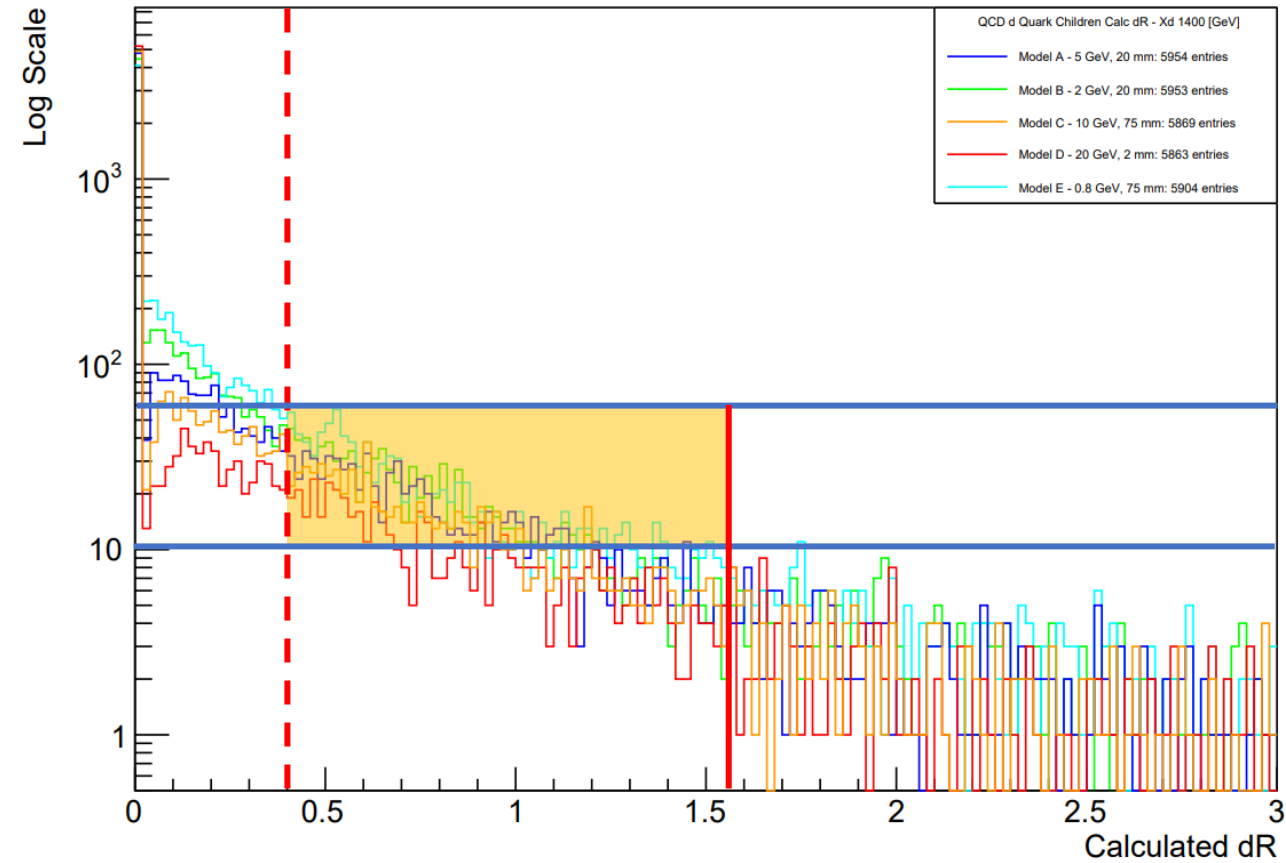


ΔR for Direct Children

Calculated dR between Original Dark Quark and its Direct Children

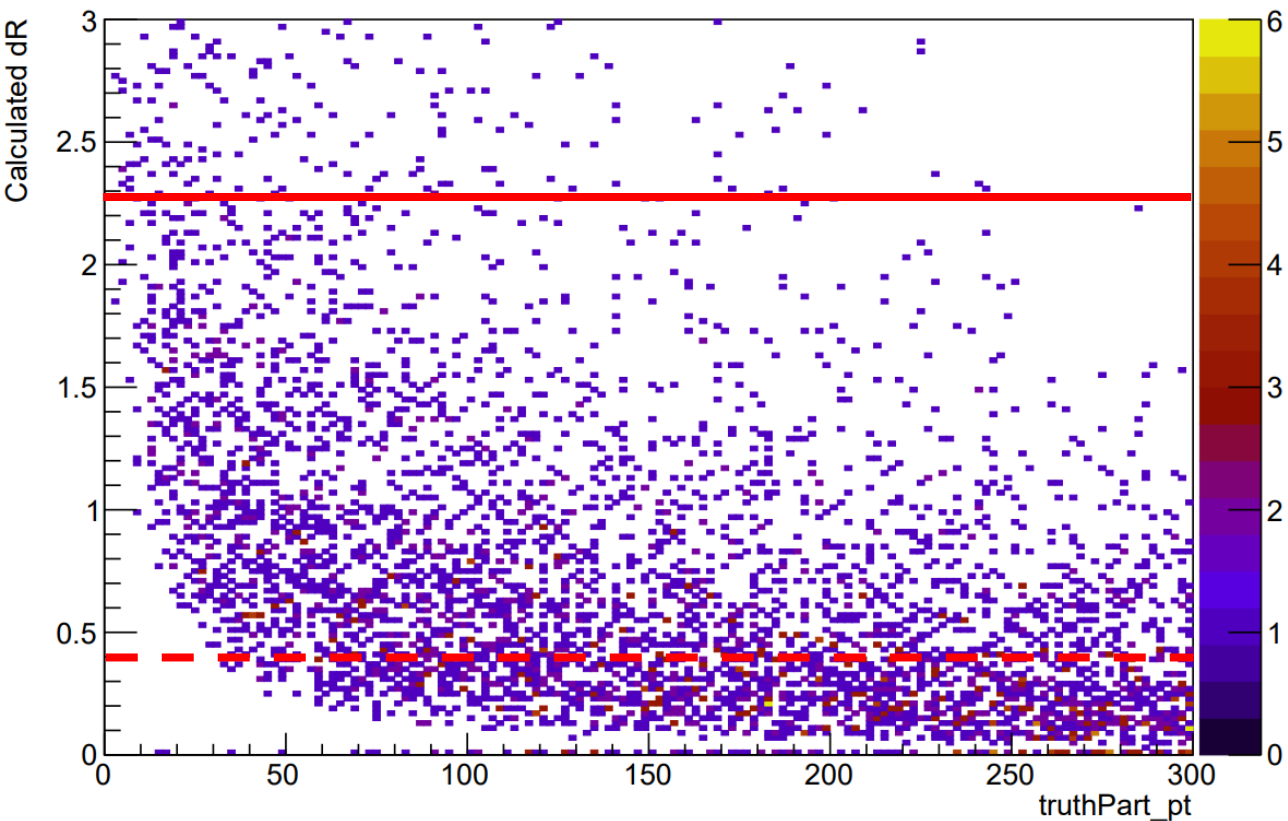


Calculated dR between Original Down Quark and its Direct Children

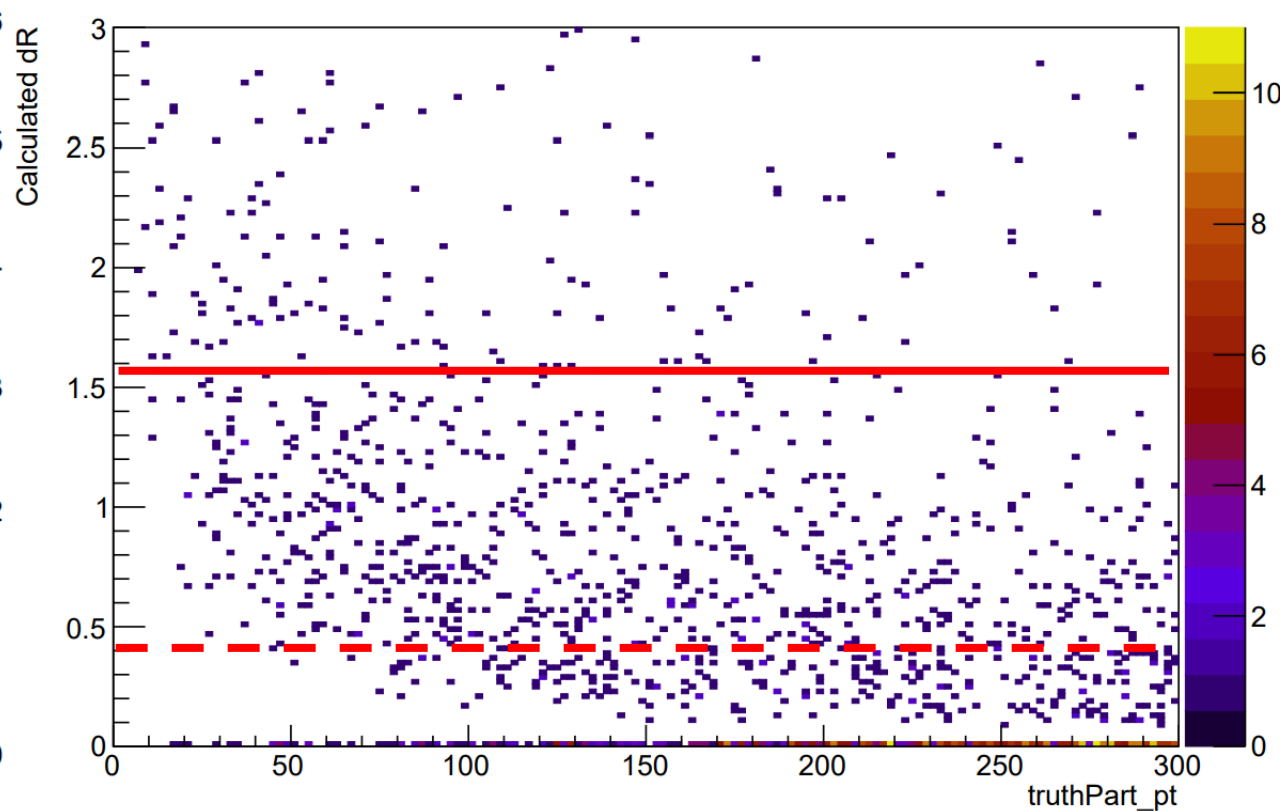


ΔR vs p_T for Direct Children (model A)

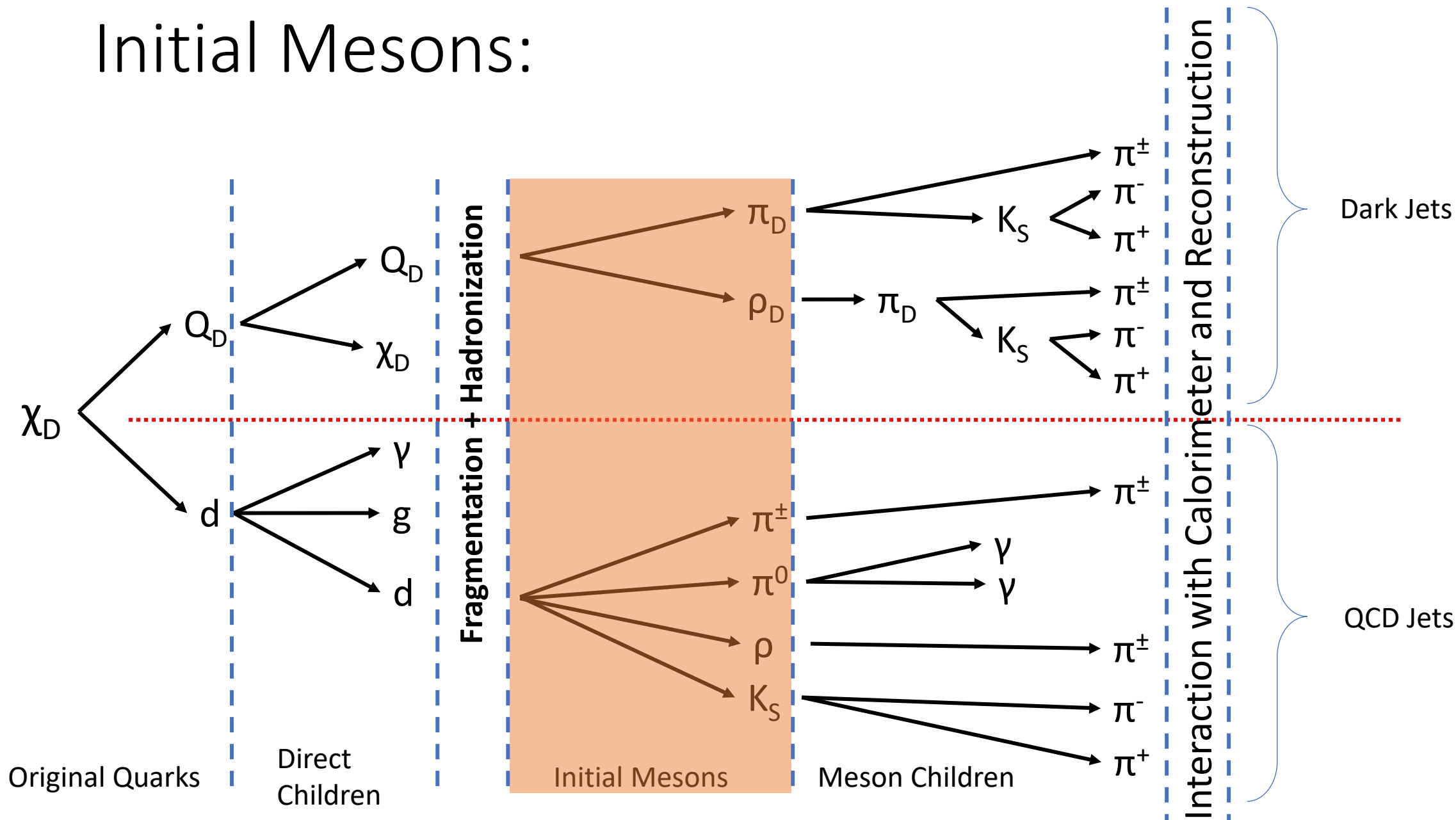
pT vs. Calculated dR between Original Dark Quark and its Direct Children



pT vs. Calculated dR between Original Down Quark and its Direct Children

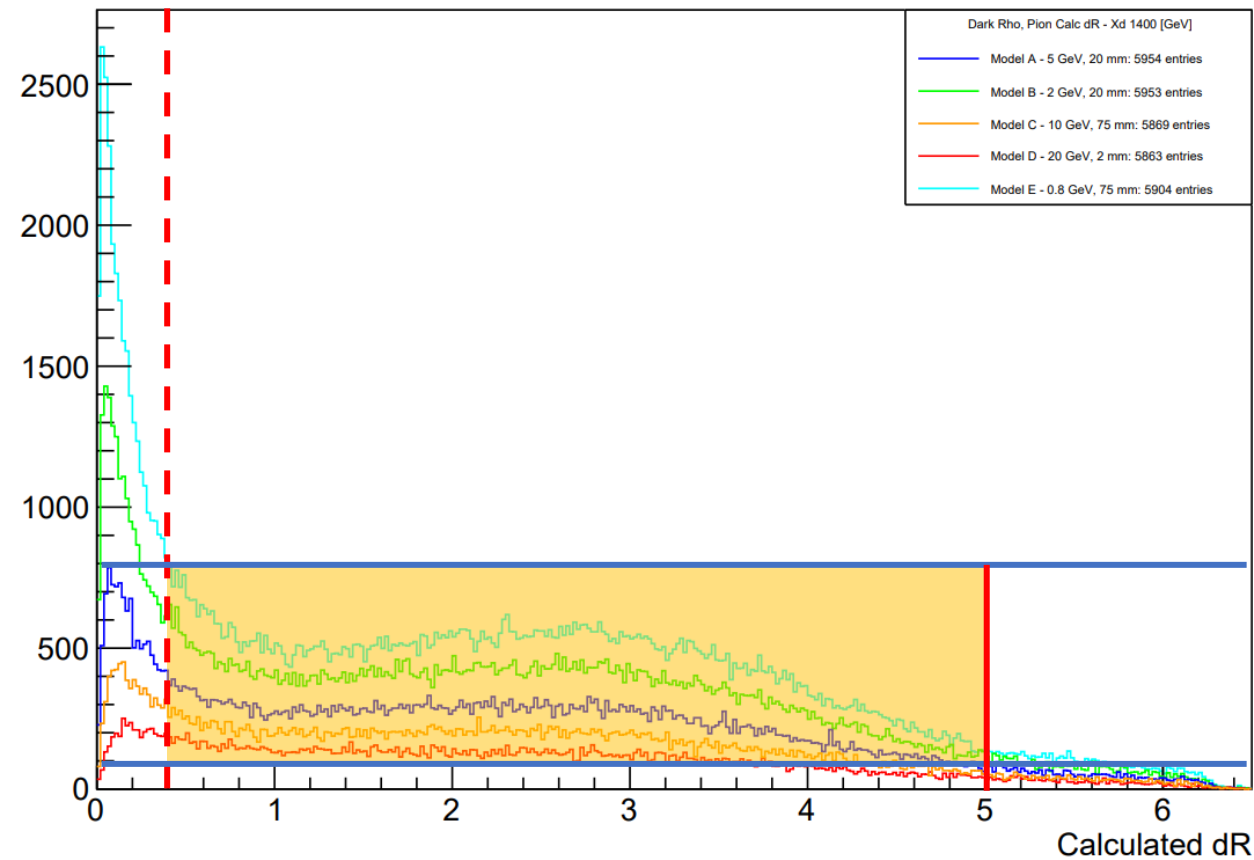


Initial Mesons:

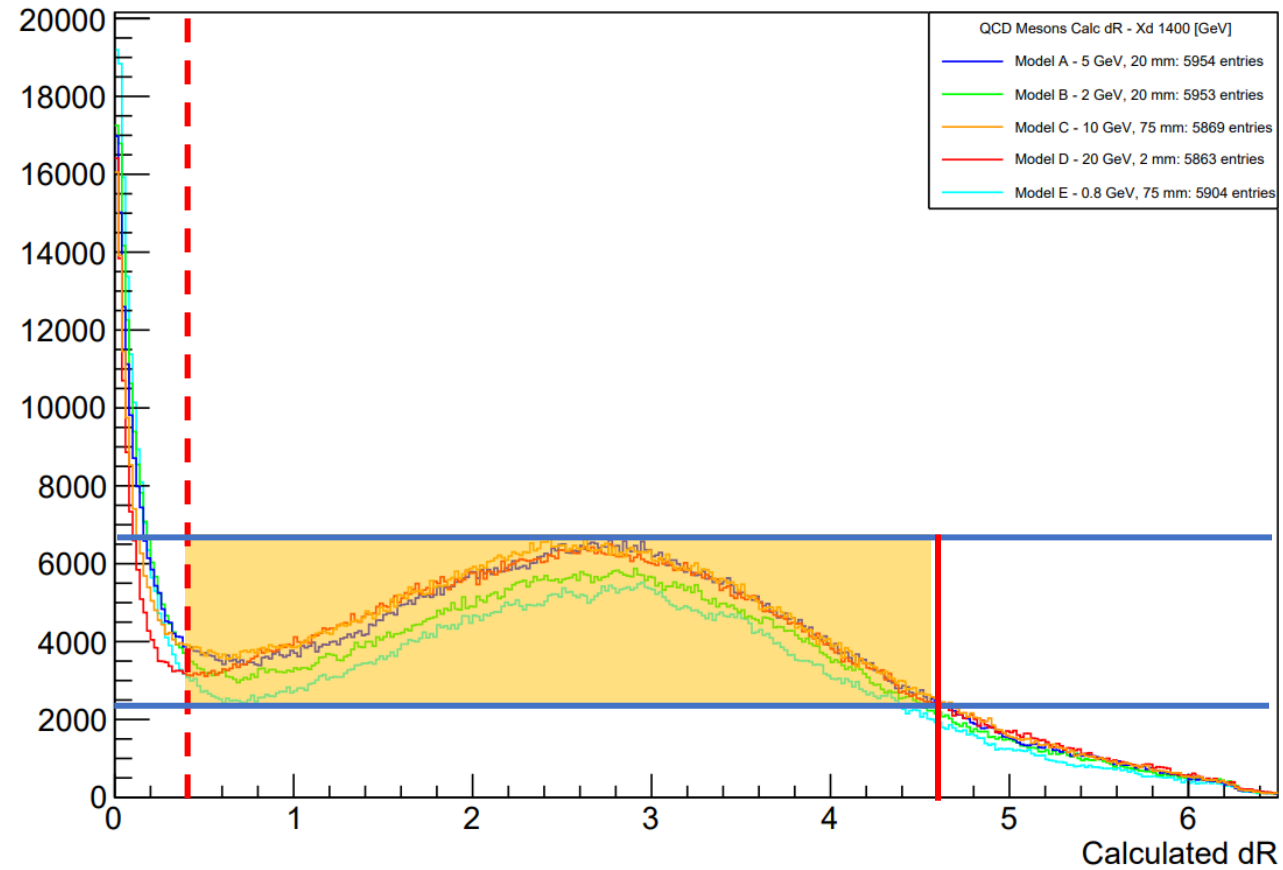


ΔR for Primary Mesons

Calculated dR between Dark Pion, Rho and Original Dark Quark

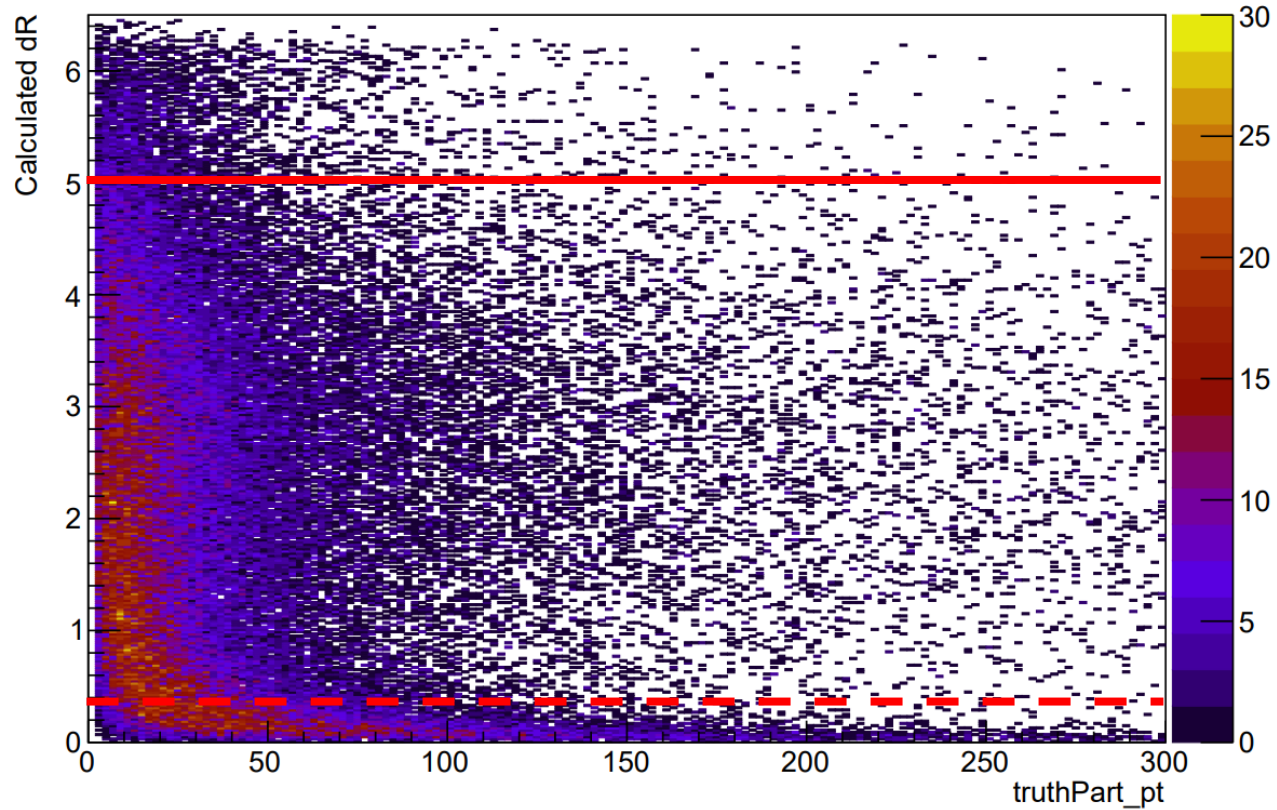


Calculated dR between Initial Mesons and Original Down Quark

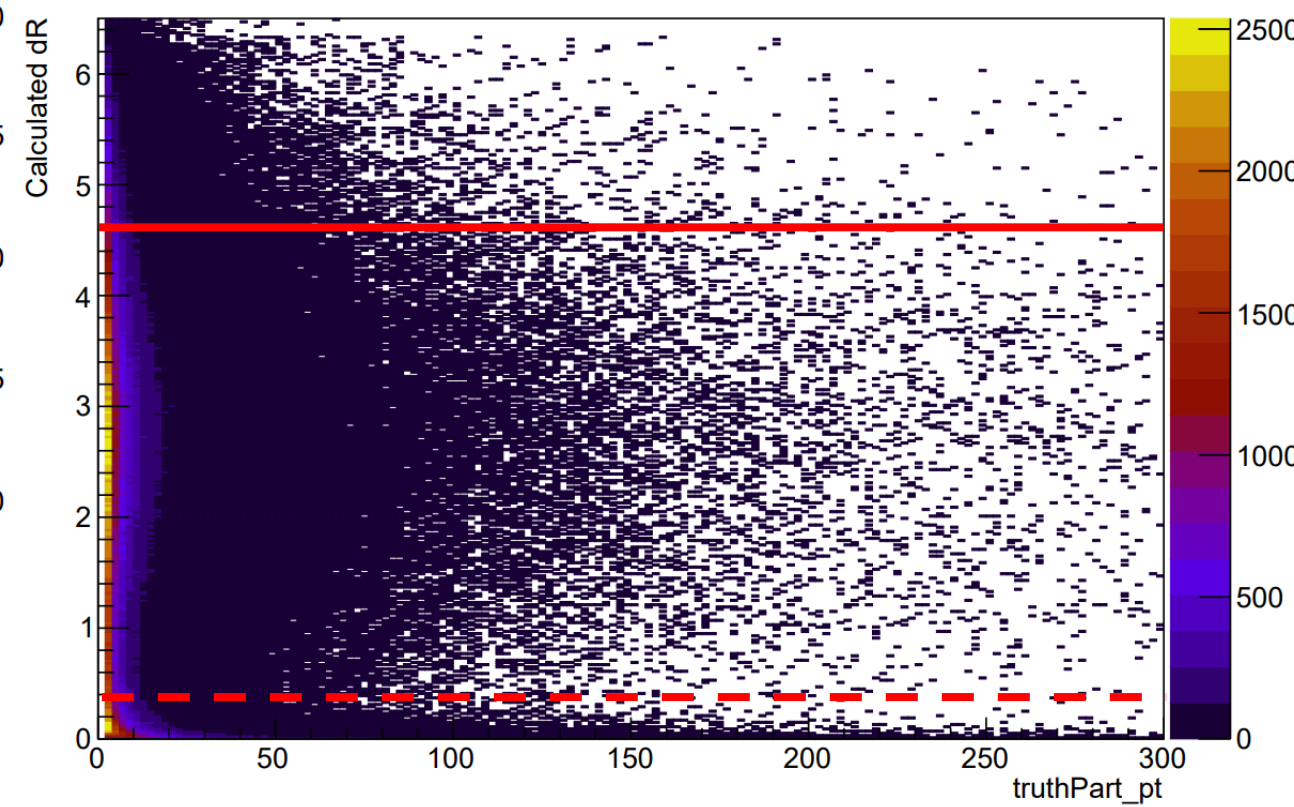


ΔR vs p_T for Initial Mesons (model A)

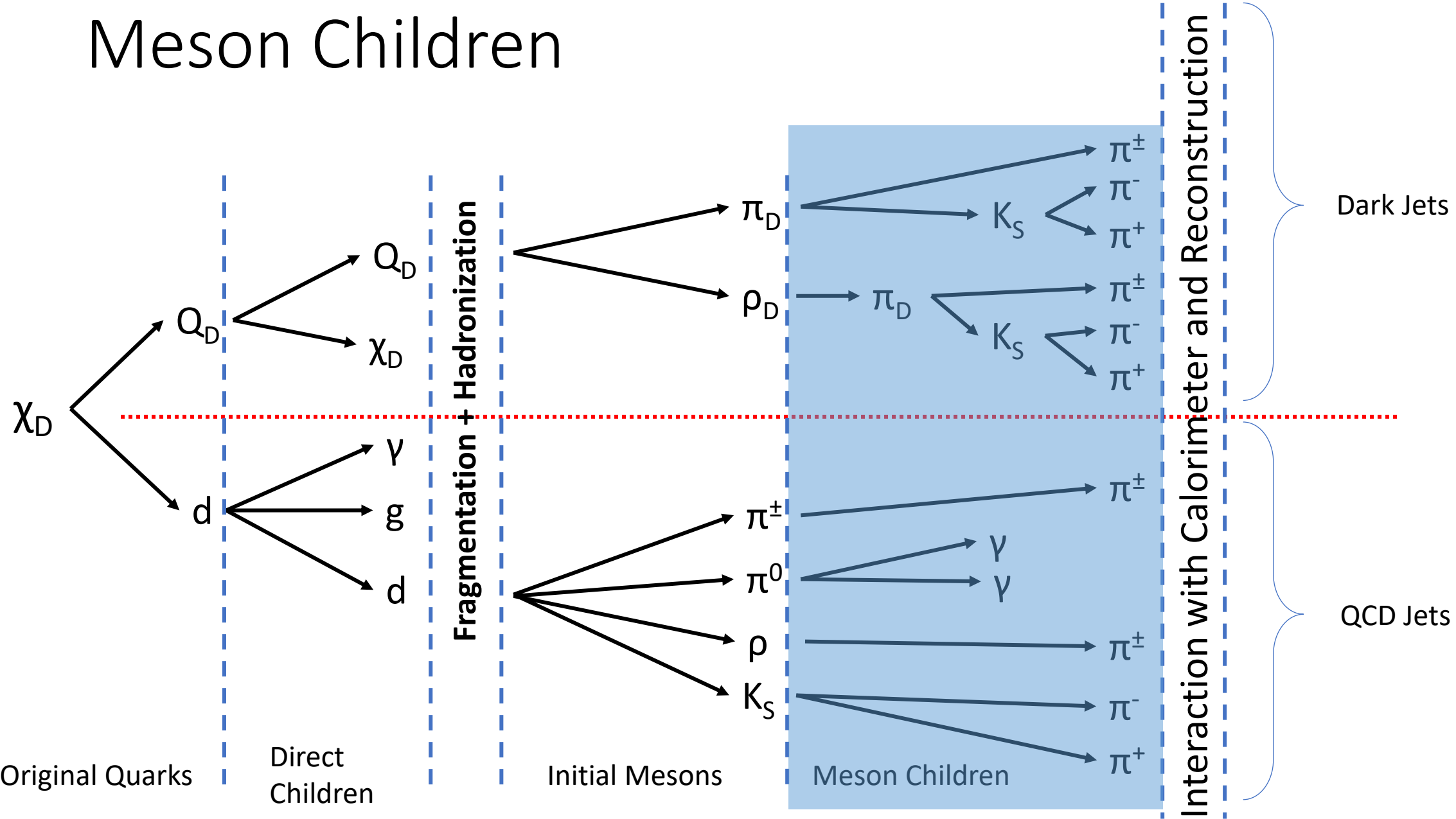
p_T vs. Calculated dR between Dark Mesons and Original Dark Quark



p_T vs. Calculated dR between QCD Mesons and Original Down Quark

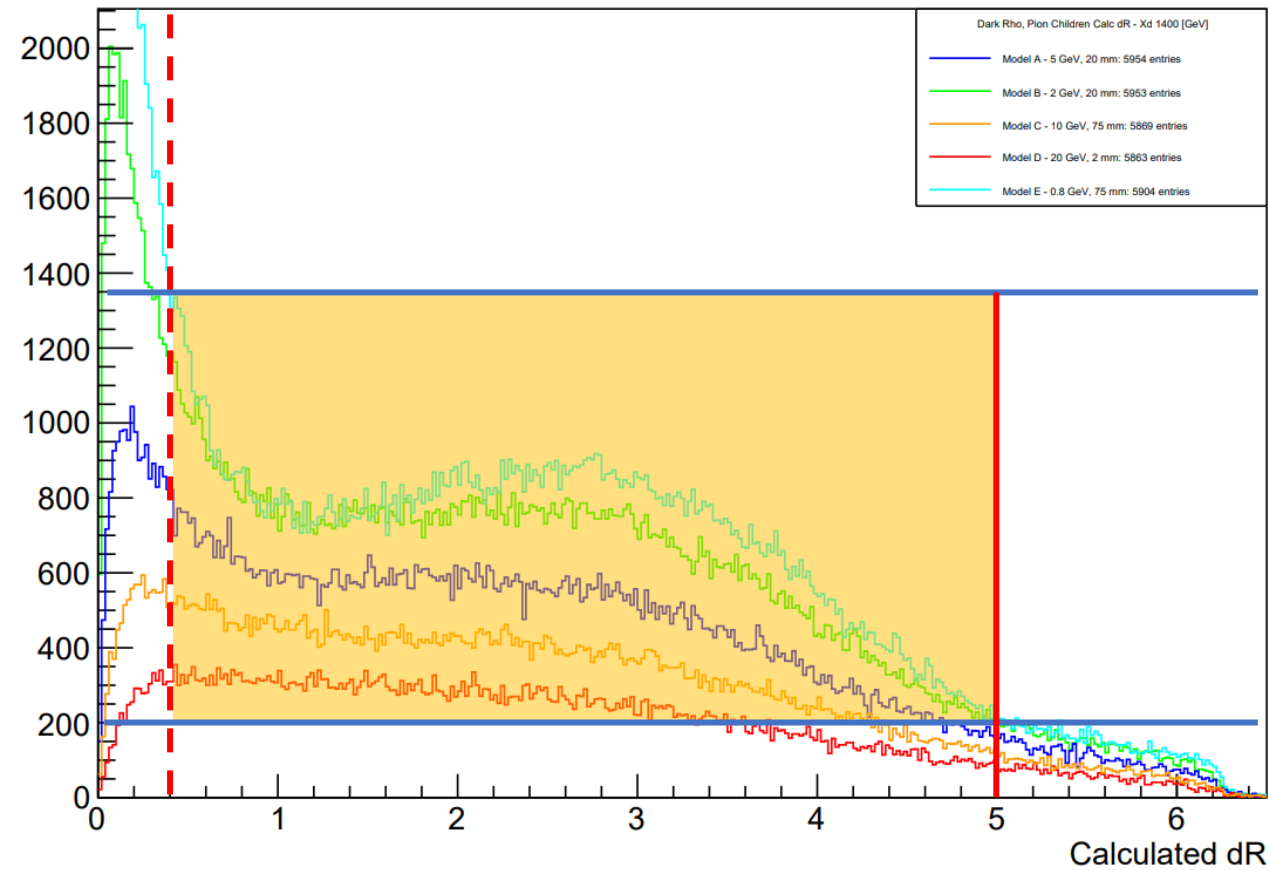


Meson Children

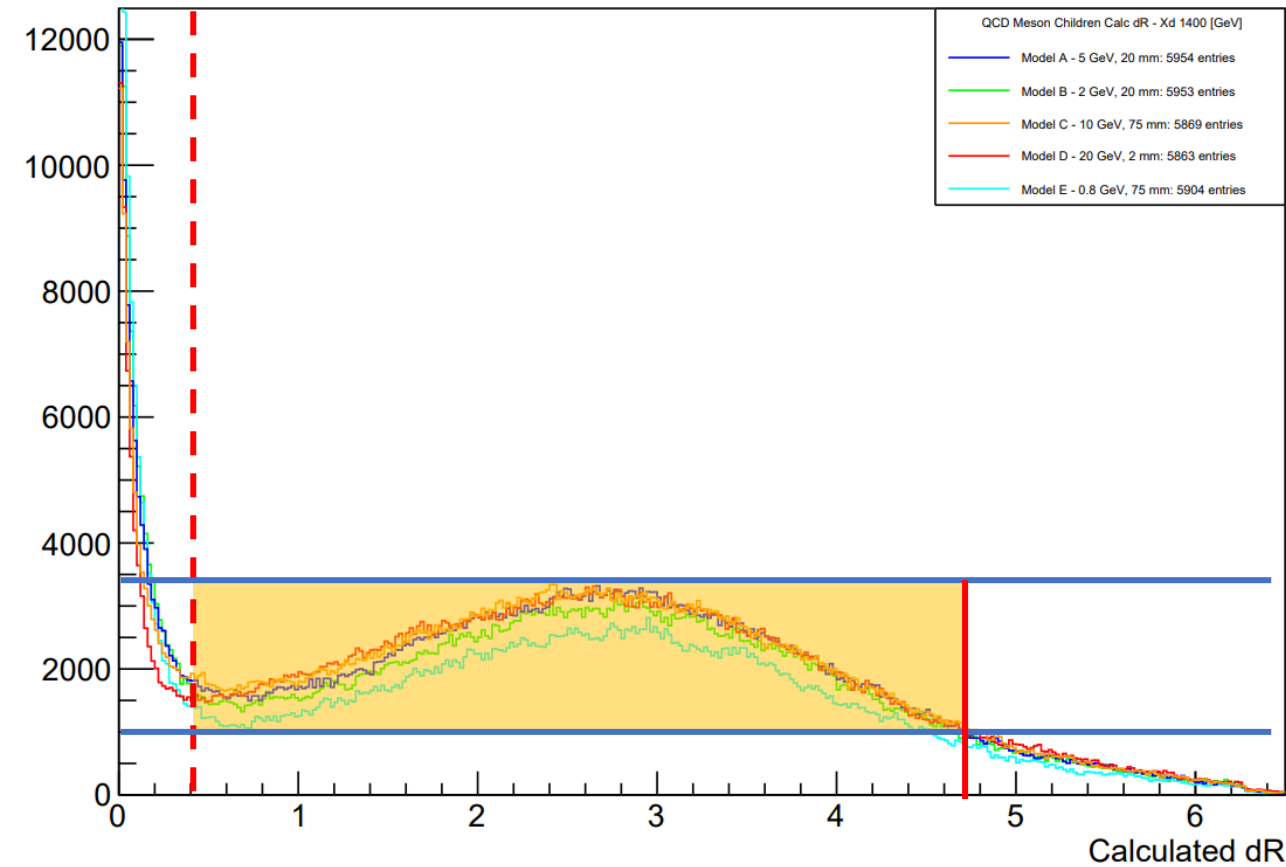


ΔR for Meson Children

Calculated dR between Dark Rho, Pion Children and Original Dark Quark

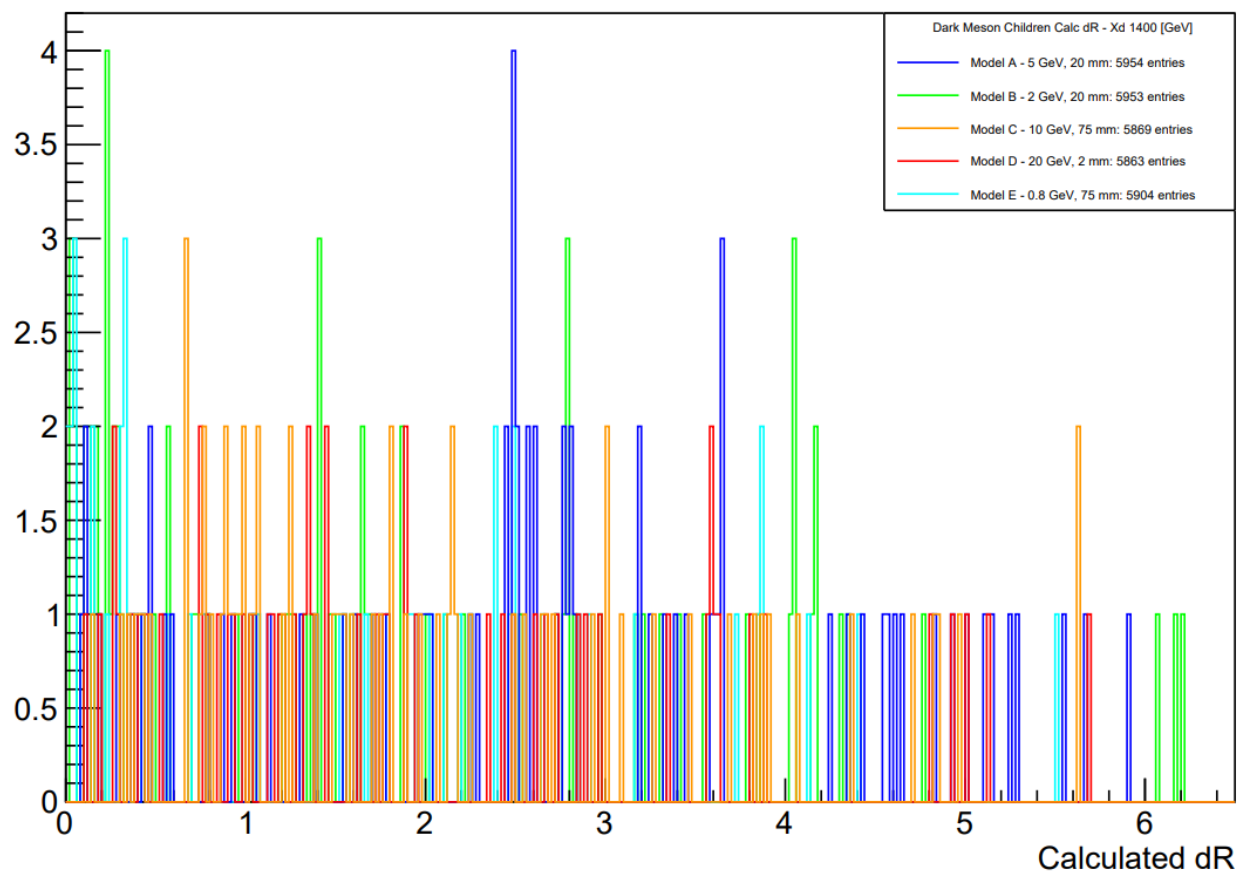


Calculated dR between QCD Meson Children and Original Down Quark

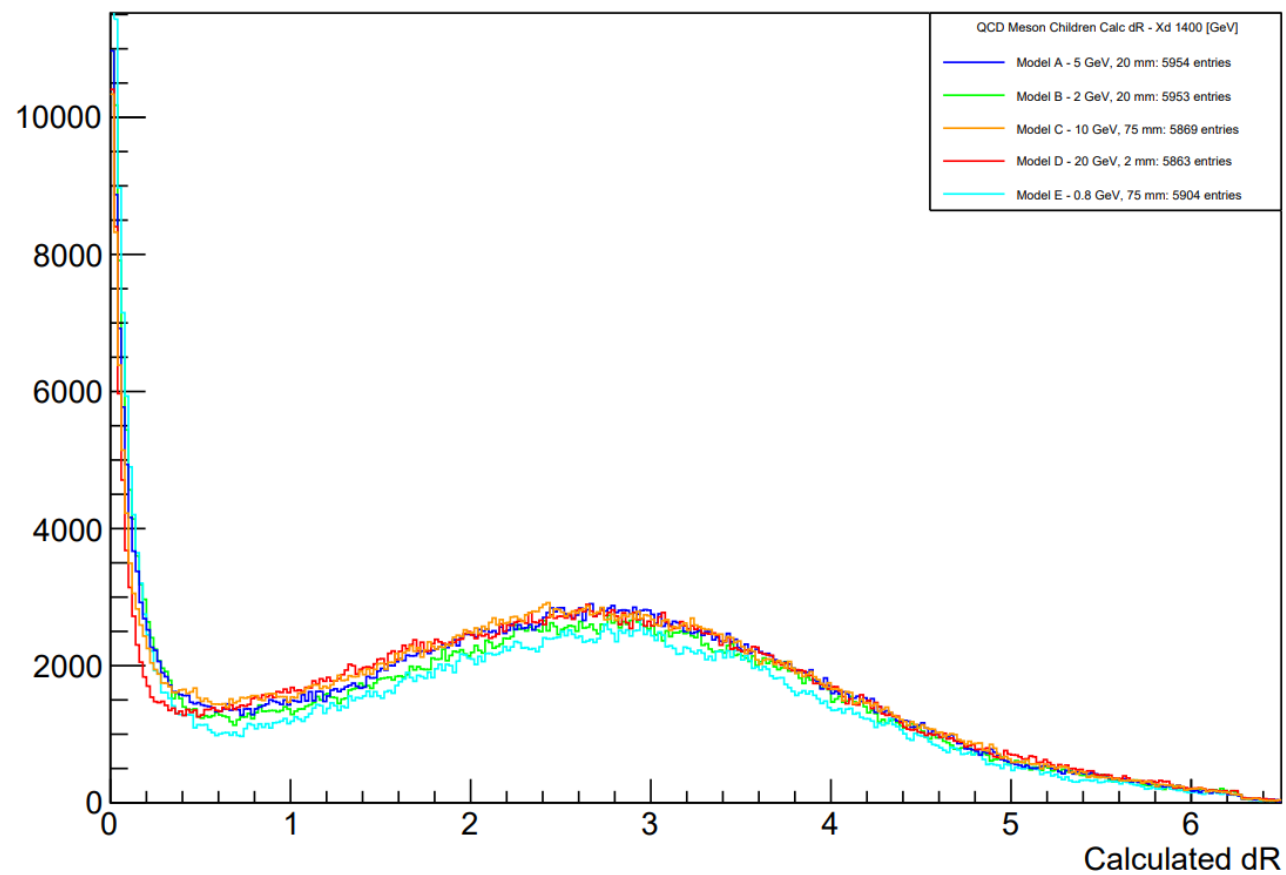


ΔR for Meson Children (Reco)

Calculated dR between Dark Meson Children (Reco) and Original Dark Quark



Calculated dR between QCD Meson Children (Reco) and Original Down Quark



Meson Children

- Ultimately the goal is to measure the ΔR spread of the final state reconstructed particles associated to the original quarks
- Need a way of ensuring that that the reconstructed particles are associated to one of the original quarks other than status