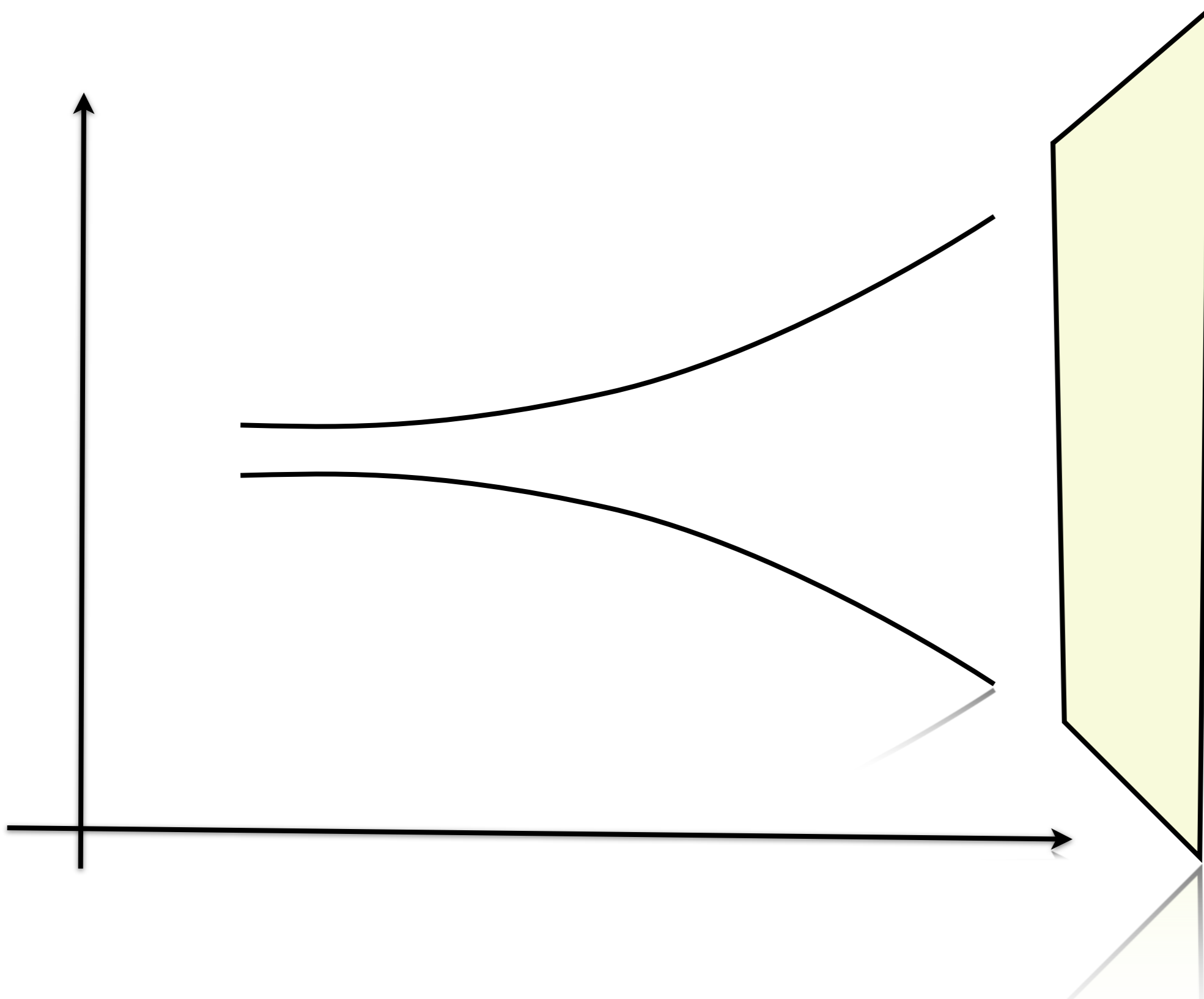
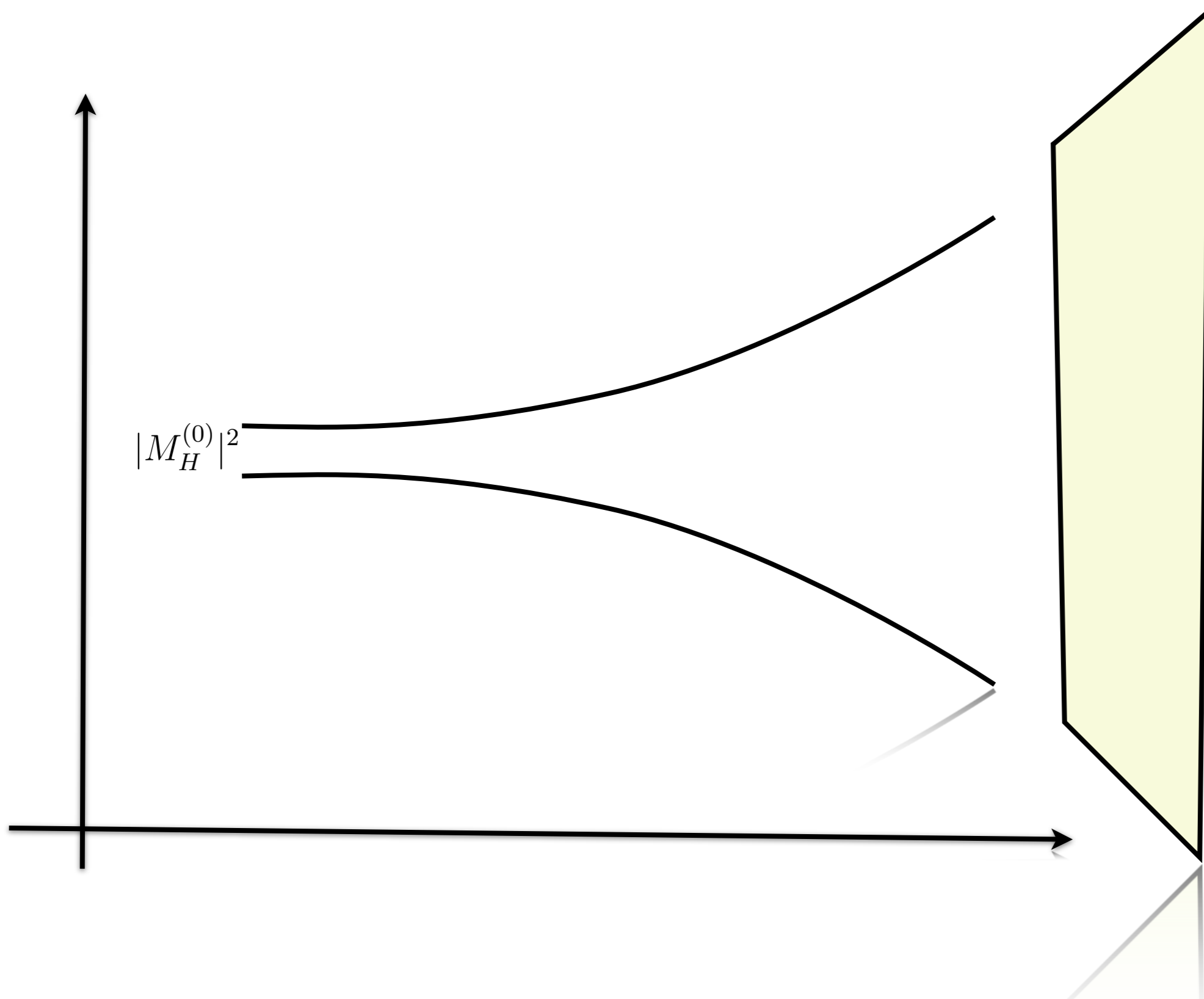


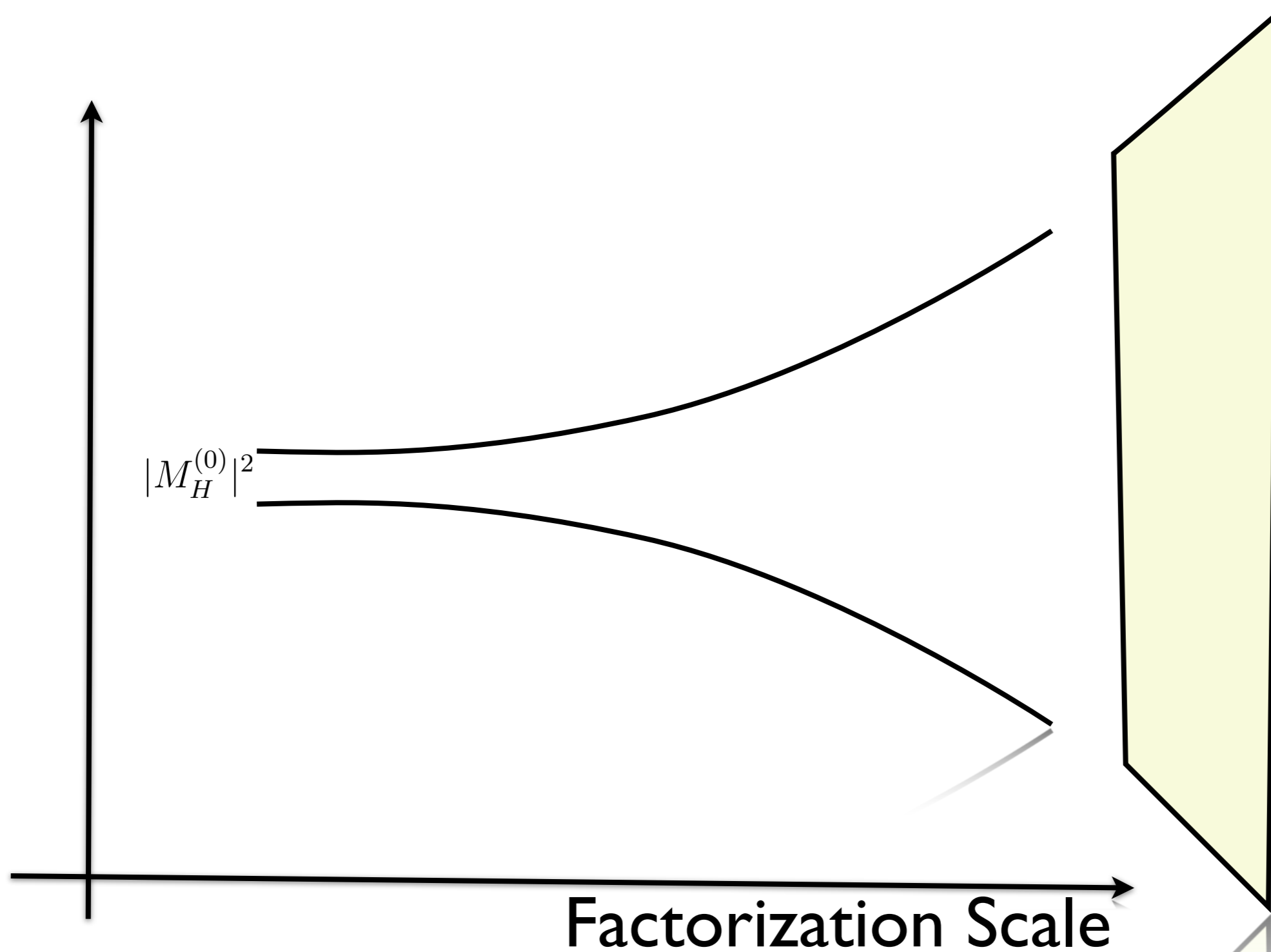
# Peter Skands (QCD/Pheno)



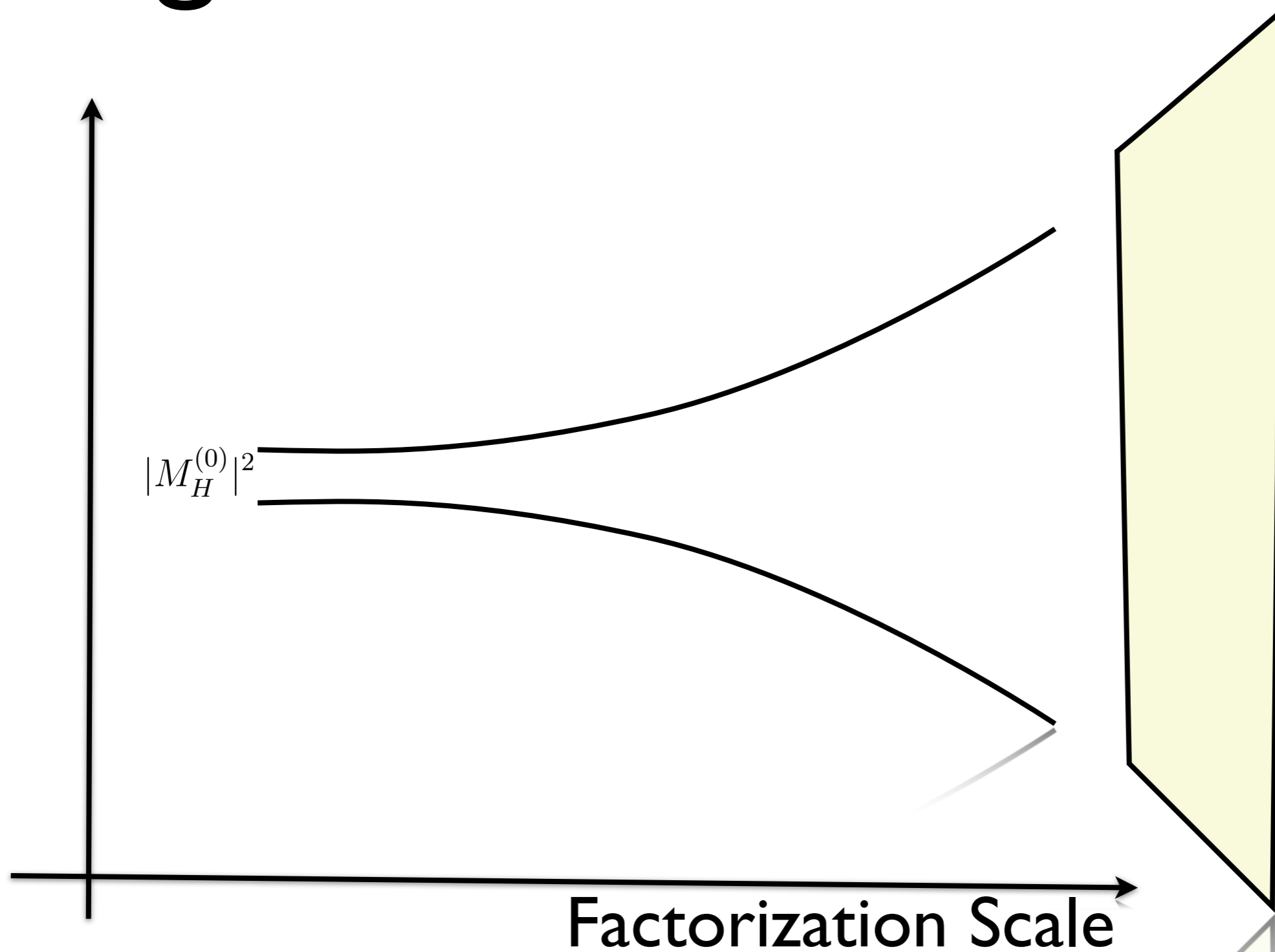
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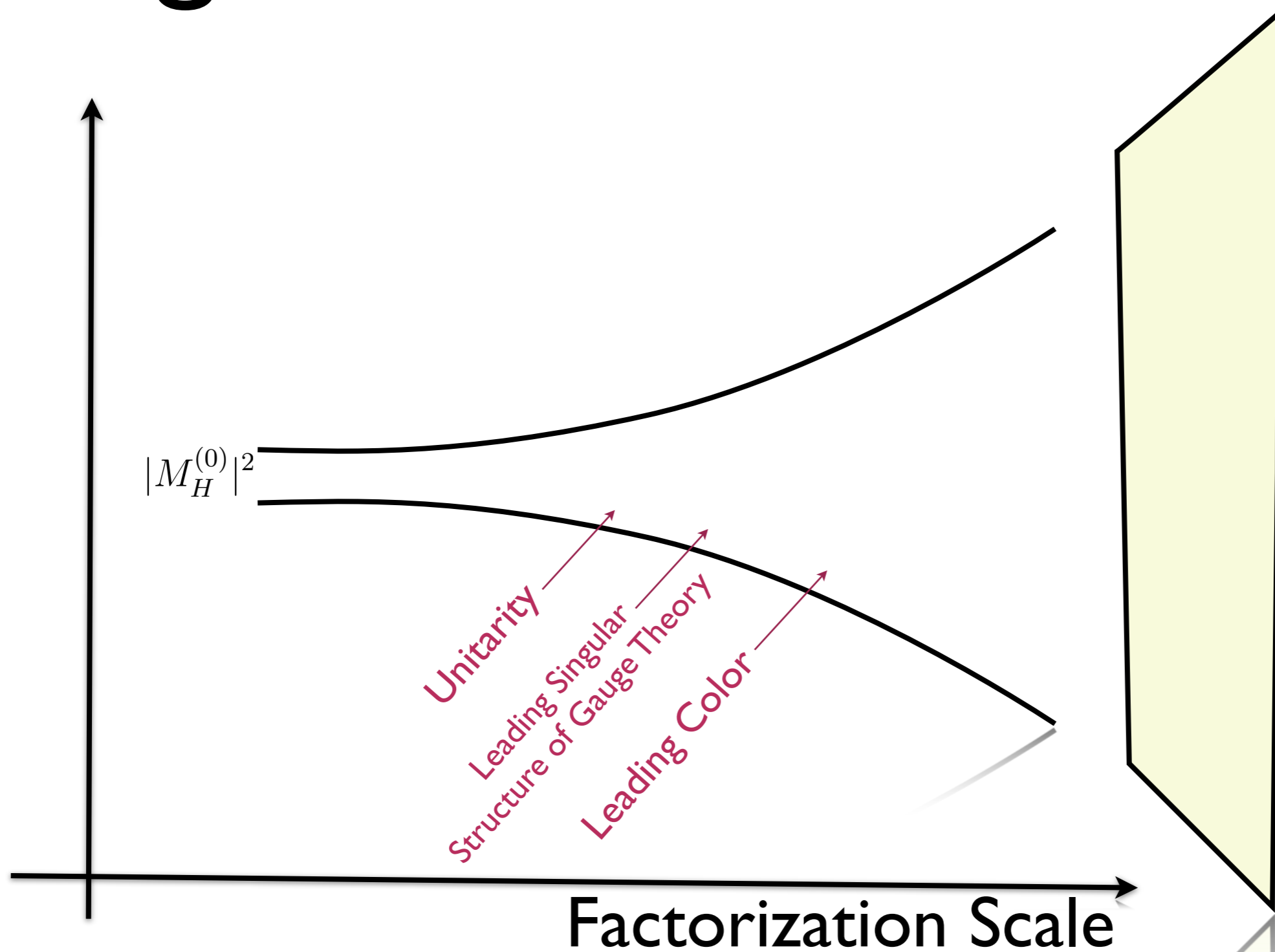
# Peter Skands (QCD/Pheno)



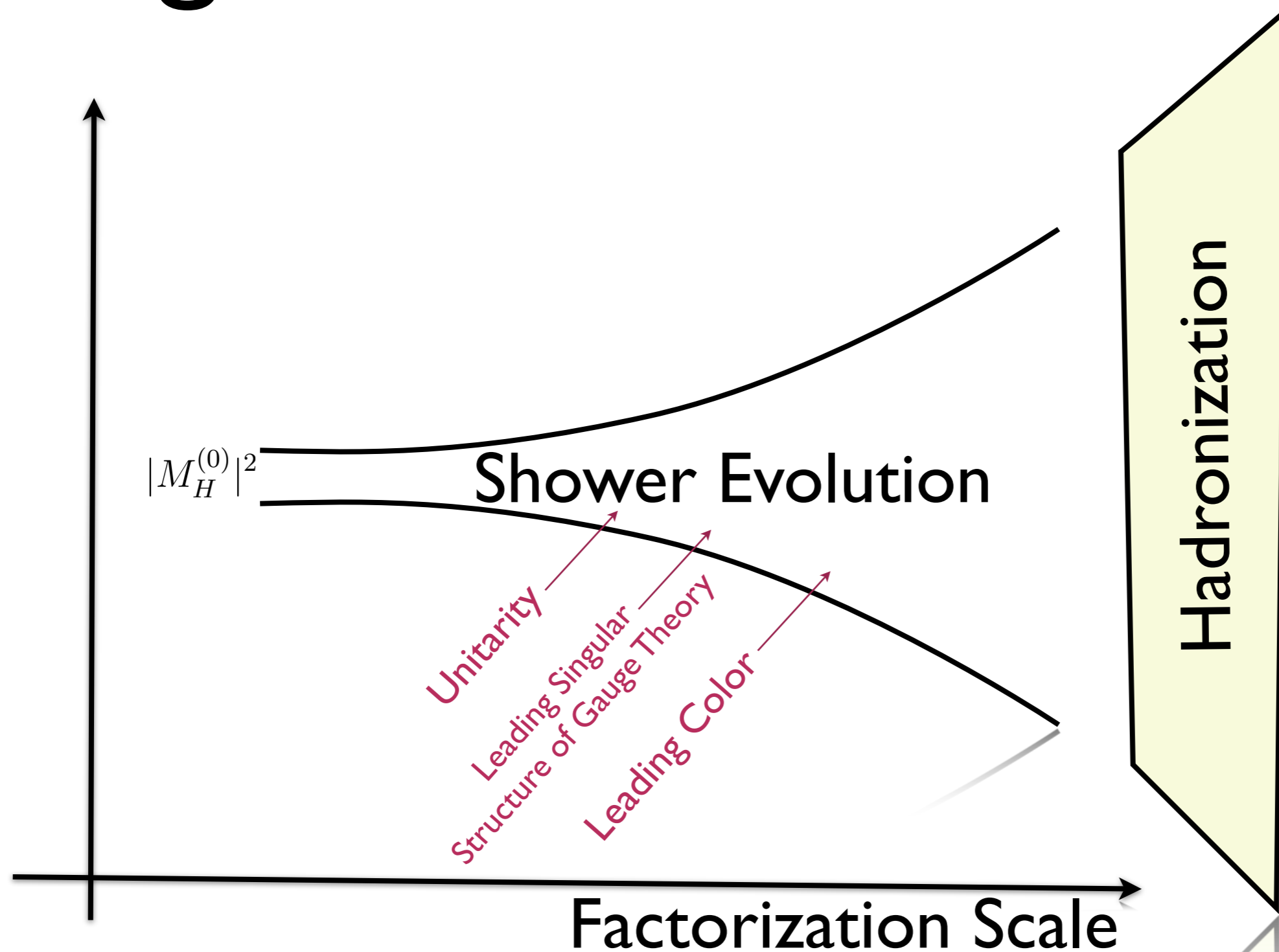
# Higher-Order Corrections



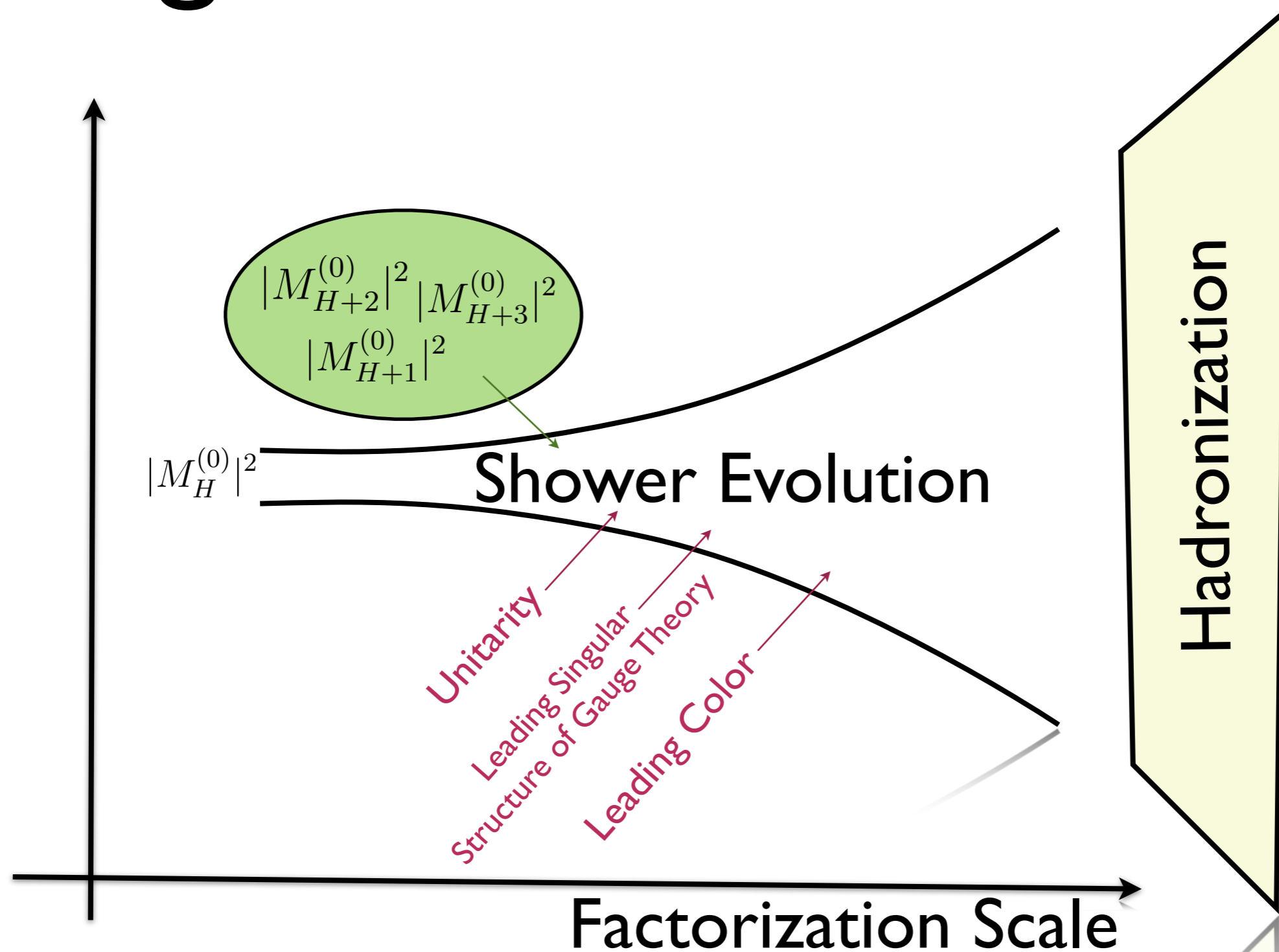
# Higher-Order Corrections



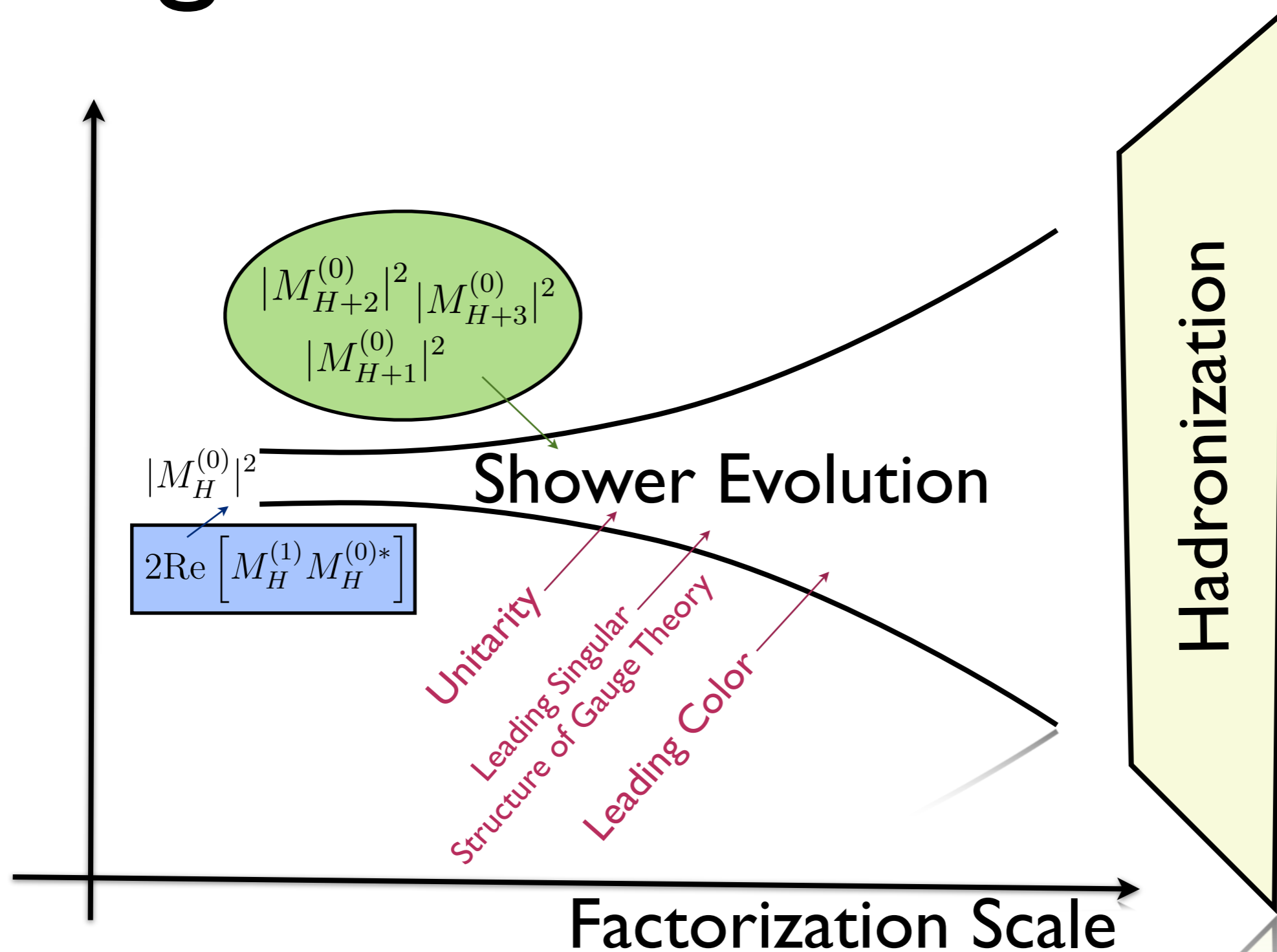
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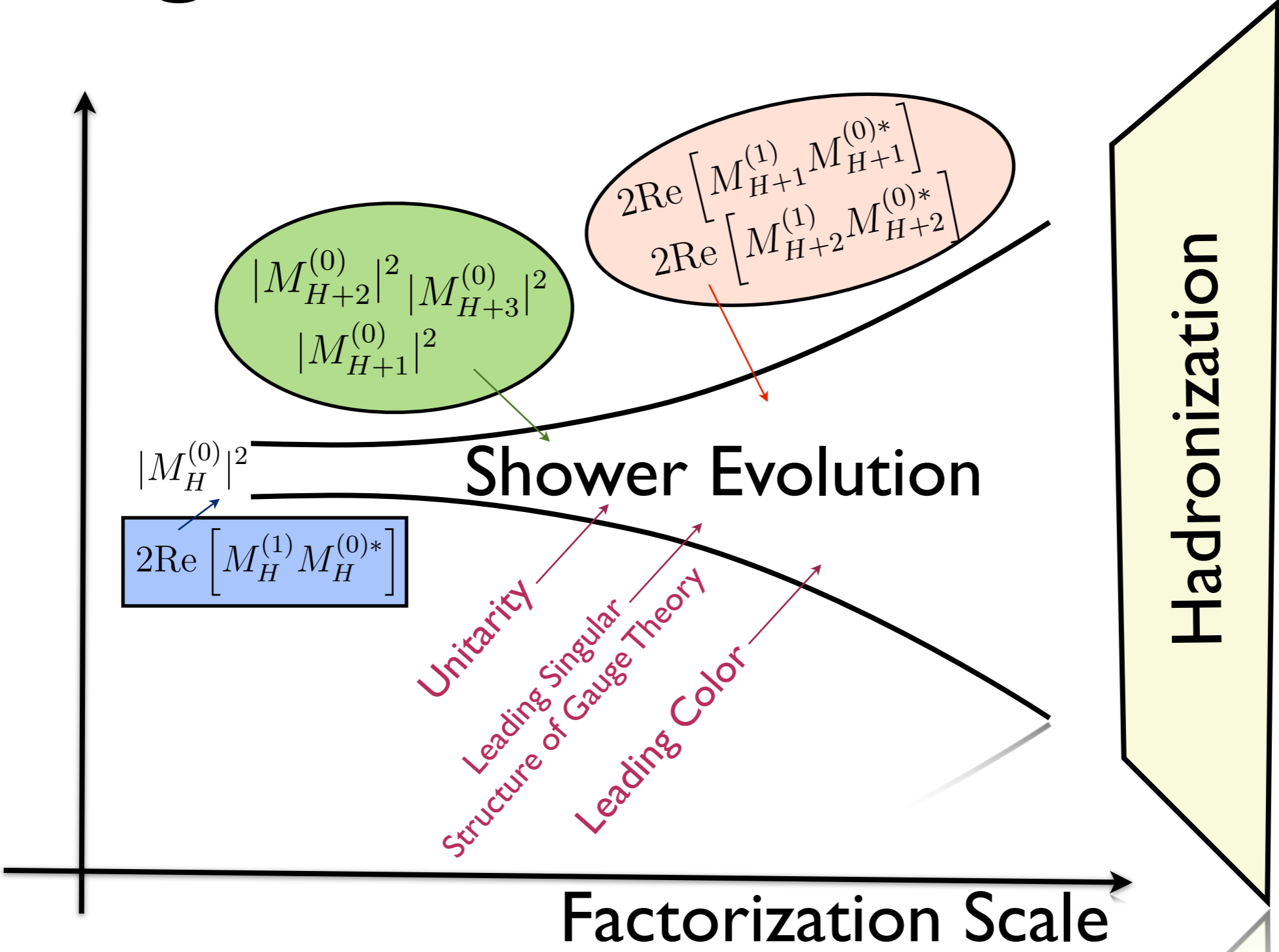


# Higher-Order Corrections

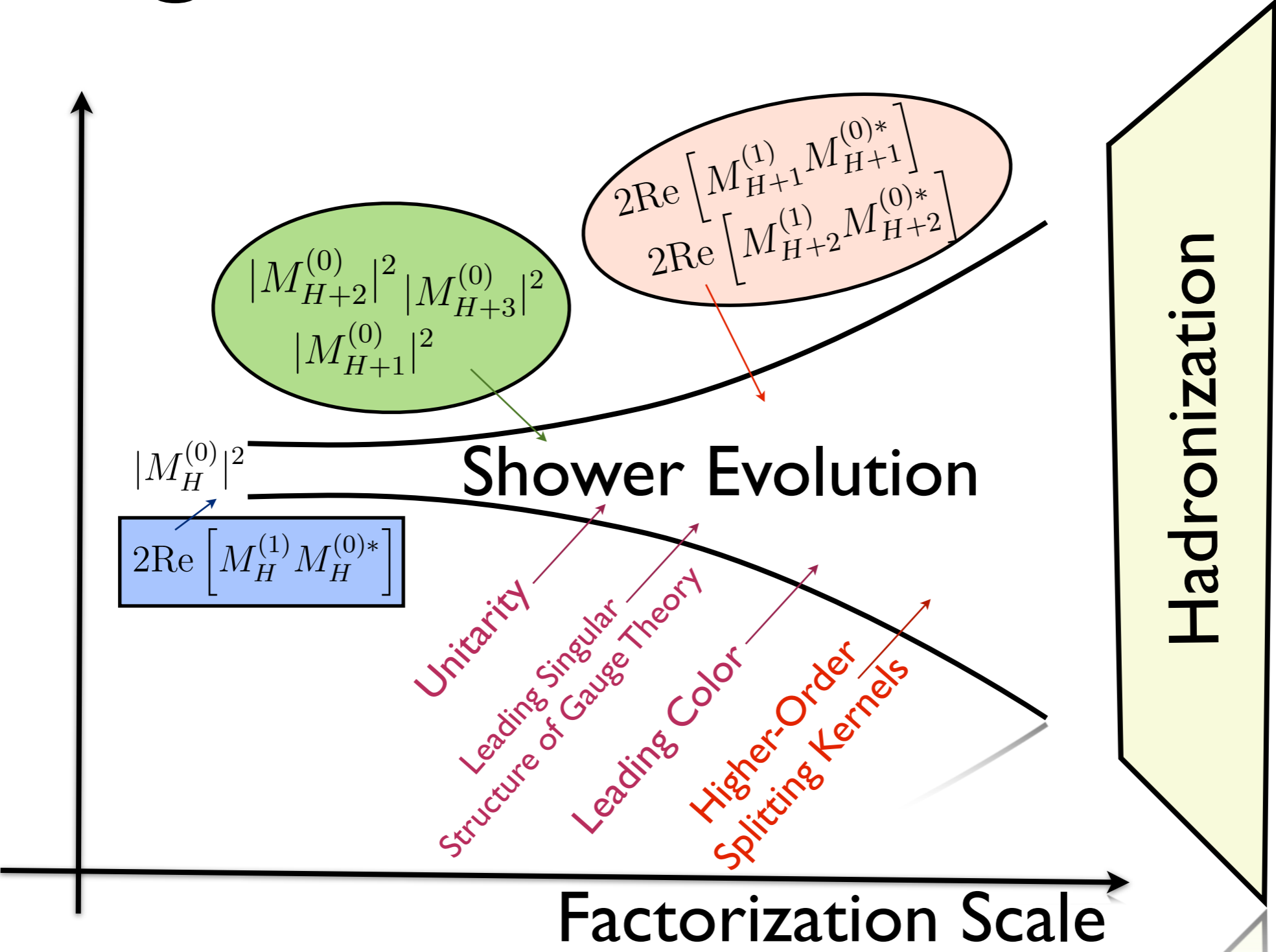




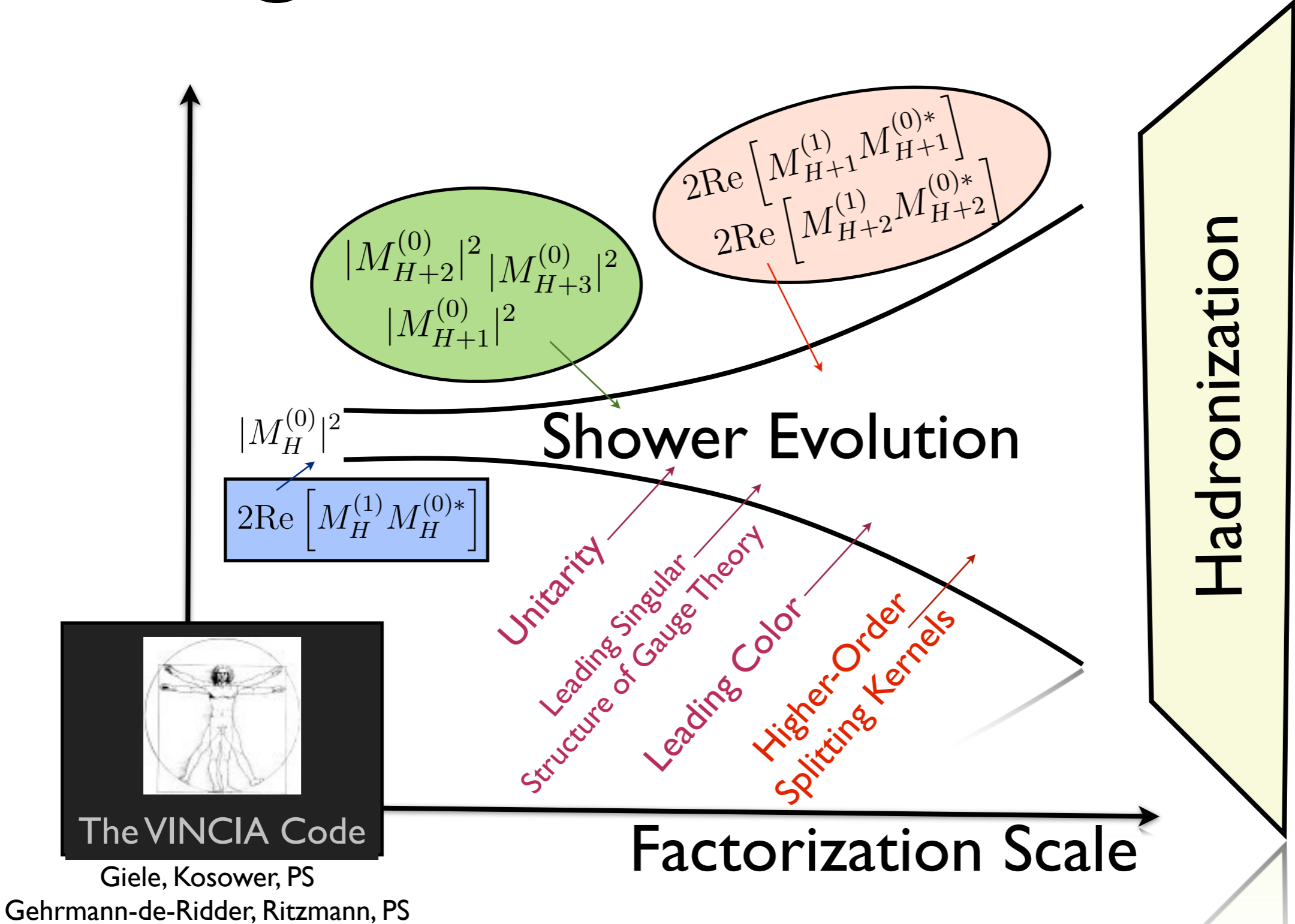
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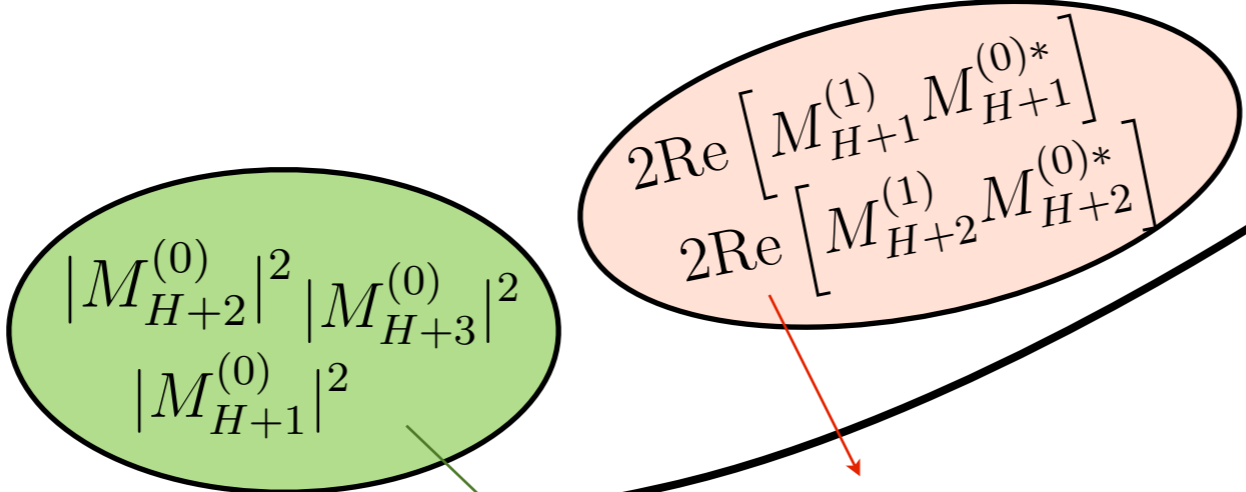


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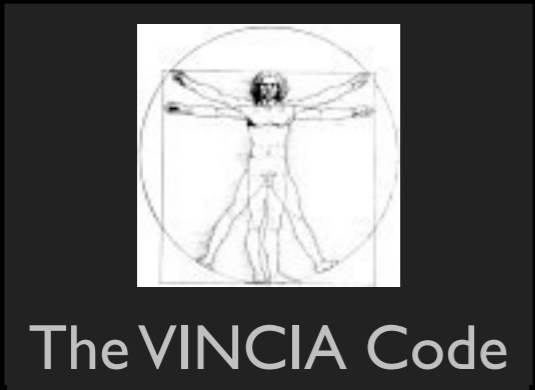
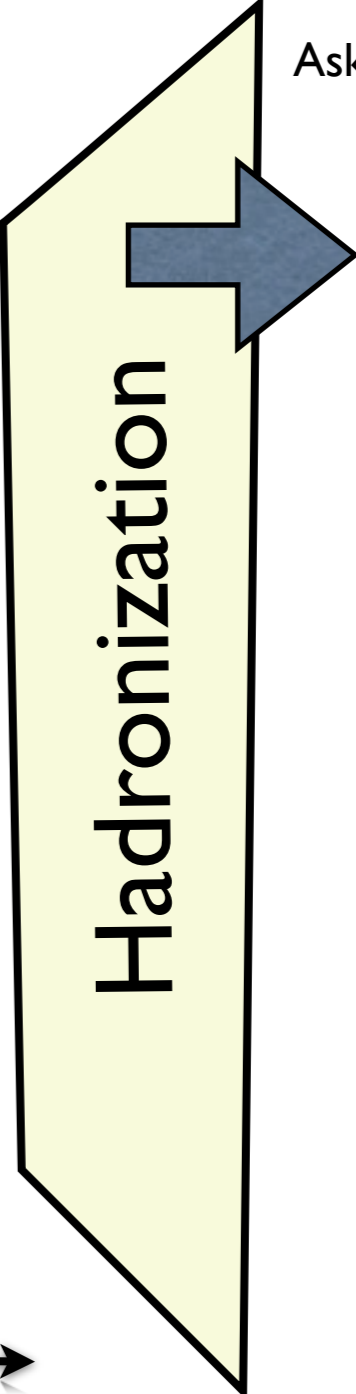
Sjostrand,  
Ask, Corke, Mrenna, PS



PYTHIA



- Unitarity
- Leading Singular
- Structure of Gauge Theory
- Leading Color
- Higher-Order
- Splitting Kernels



The VINCIA Code

Giele, Kosower, PS

Gehrmann-de-Ridder, Ritzmann, PS

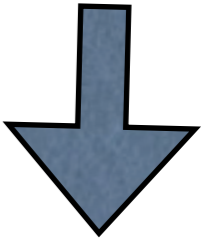
Factorization Scale

# Higher-Order Corrections

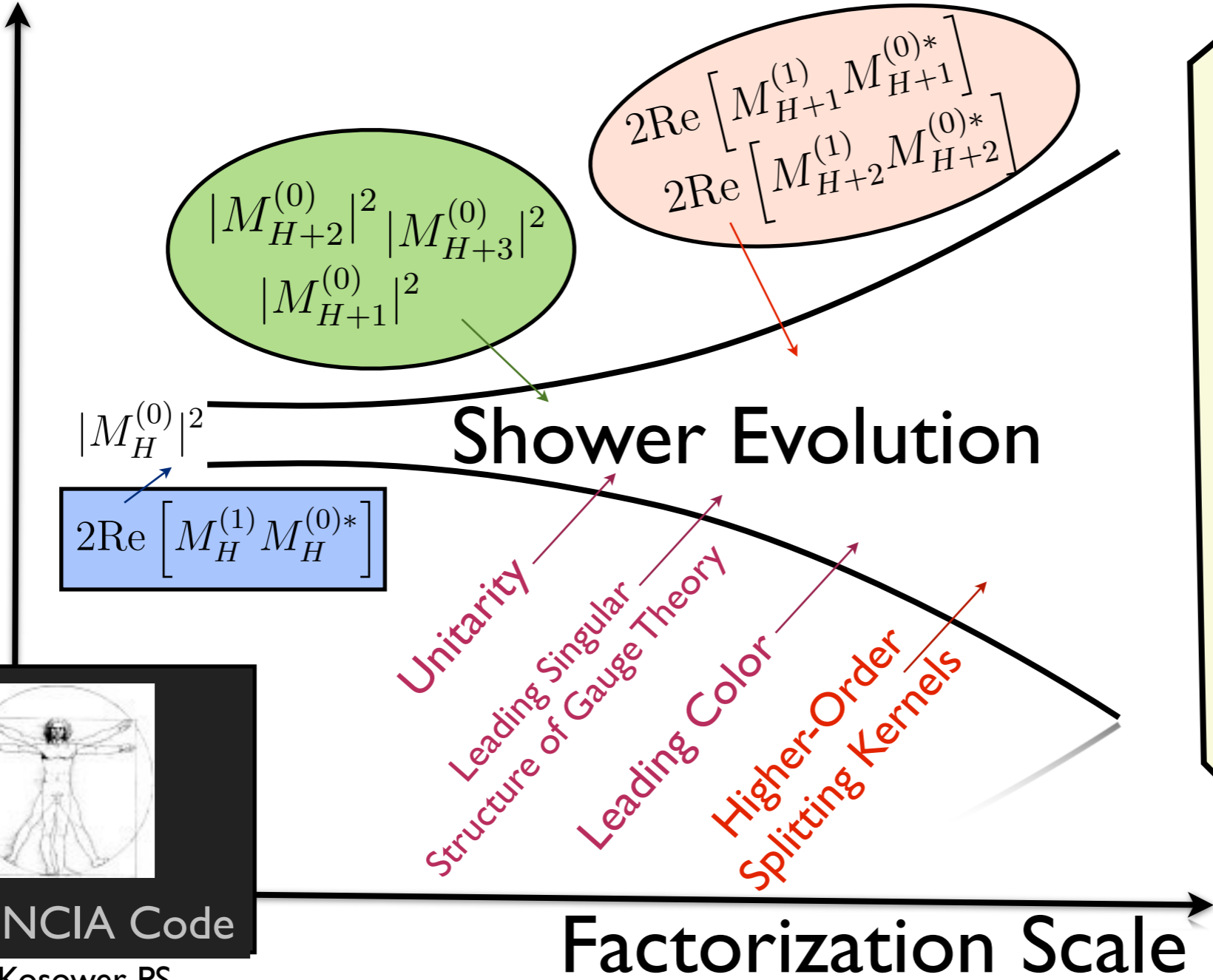
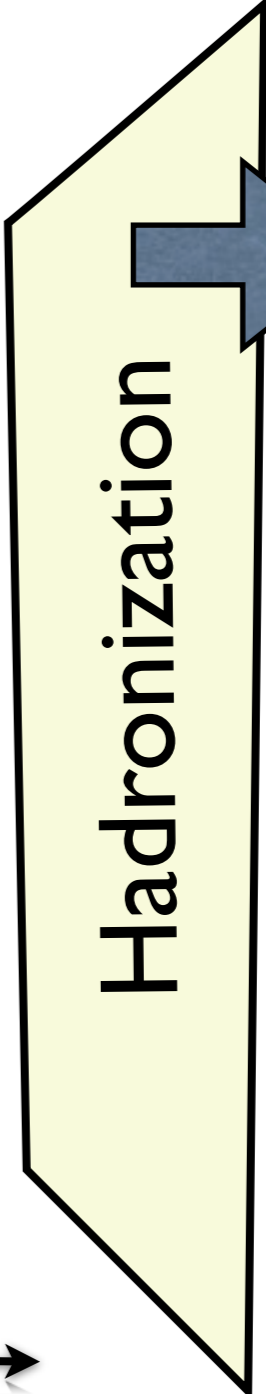
Sjostrand,  
Ask, Corke, Mrenna, PS



PYTHIA



Collider  
Observables



The VINCIA Code

Giele, Kosower, PS

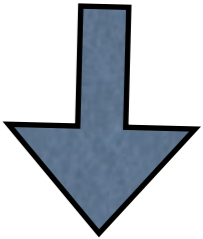
Gehrmann-de-Ridder, Ritzmann, PS

# Higher-Order Corrections

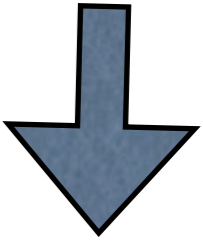
Sjostrand,  
Ask, Corke, Mrenna, PS



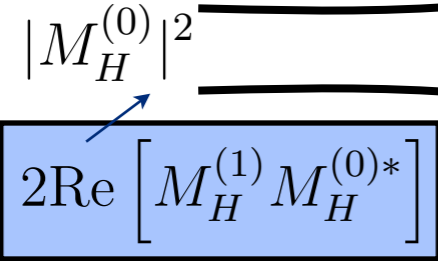
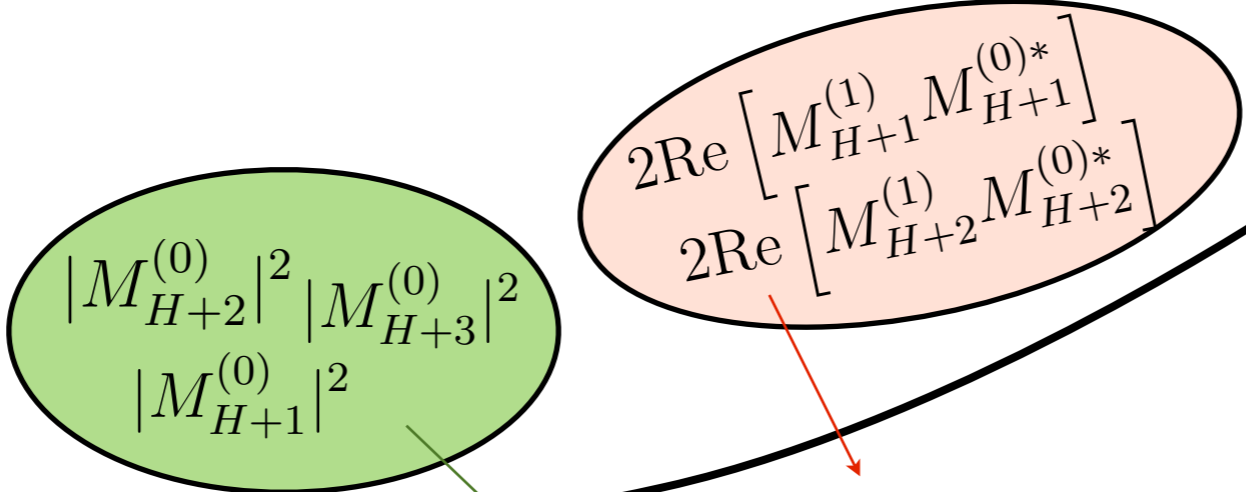
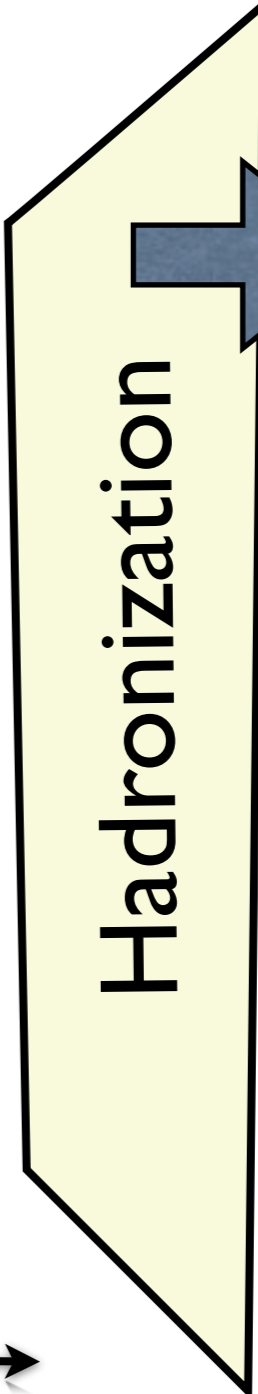
PYTHIA



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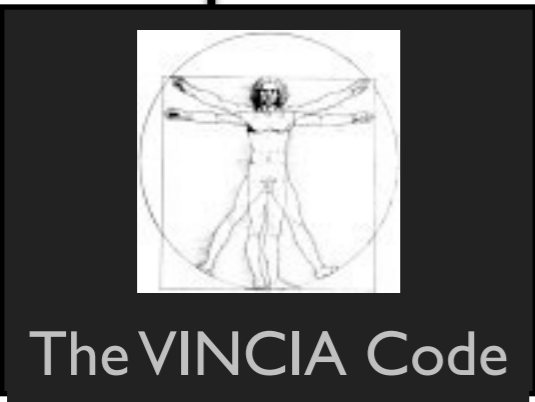
Confrontation  
with Data



Shower Evolution

- Unitarity
- Leading Singular  
Structure of Gauge Theory
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- Higher-Order  
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The VINCIA Code

Giele, Kosower, PS

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Peter Skands (QCD/Pheno)

# Early LHC Data

CMS "Ridge"

Track multiplicities

$p_T$  spectra

Identified Particles

Baryon Transport

Correlations

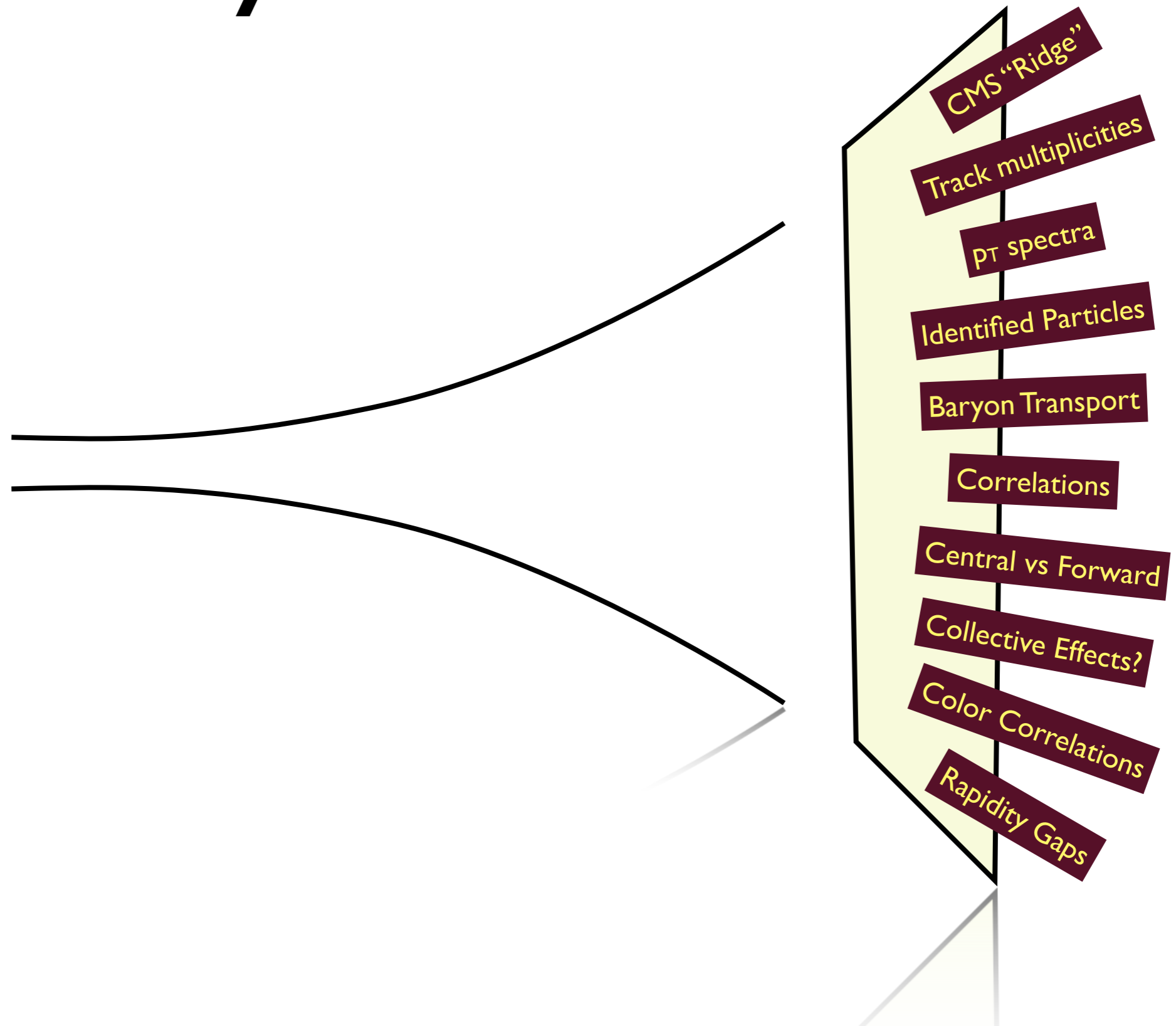
Central vs Forward

Collective Effects?

Color Correlations

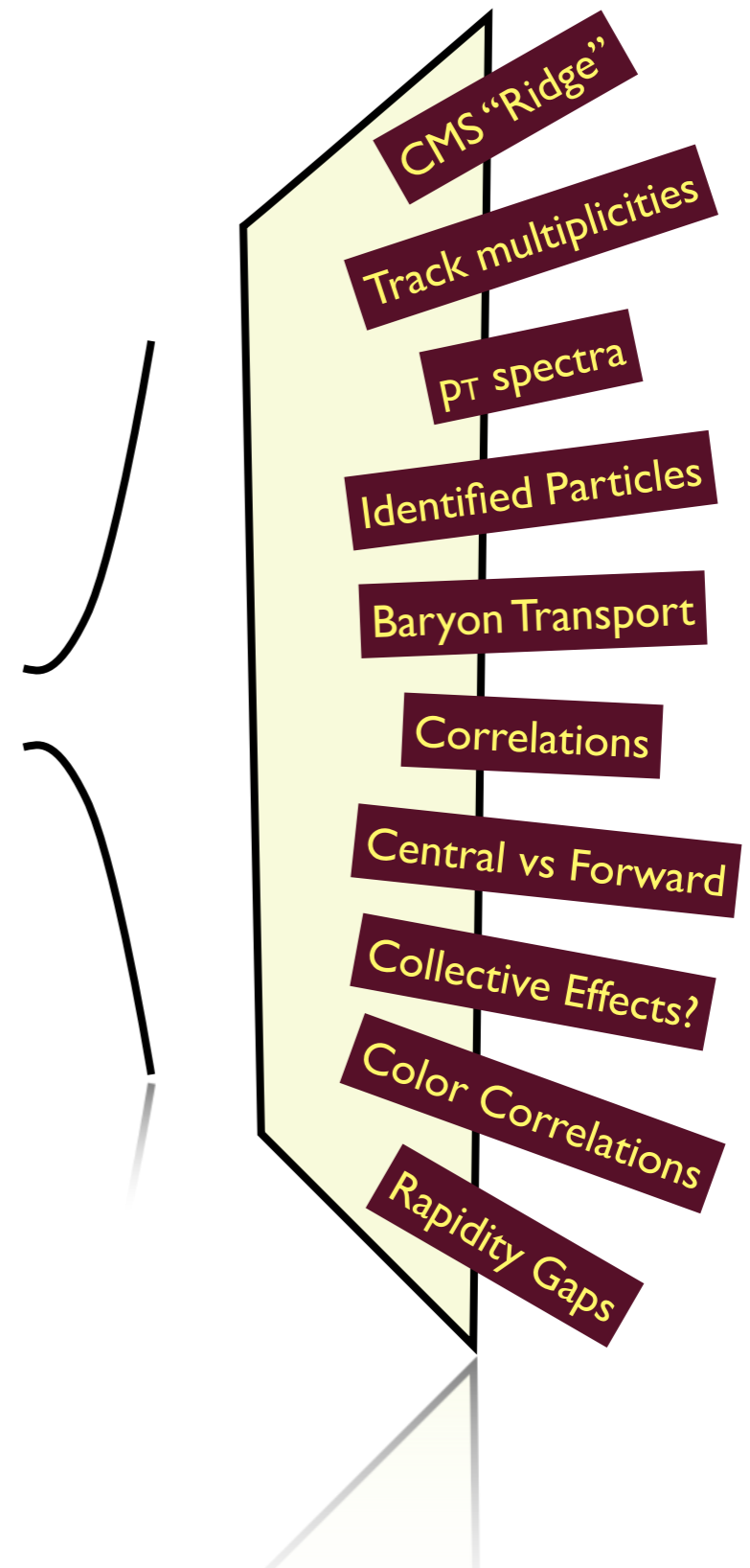
Rapidity Gaps

# Early LHC Data





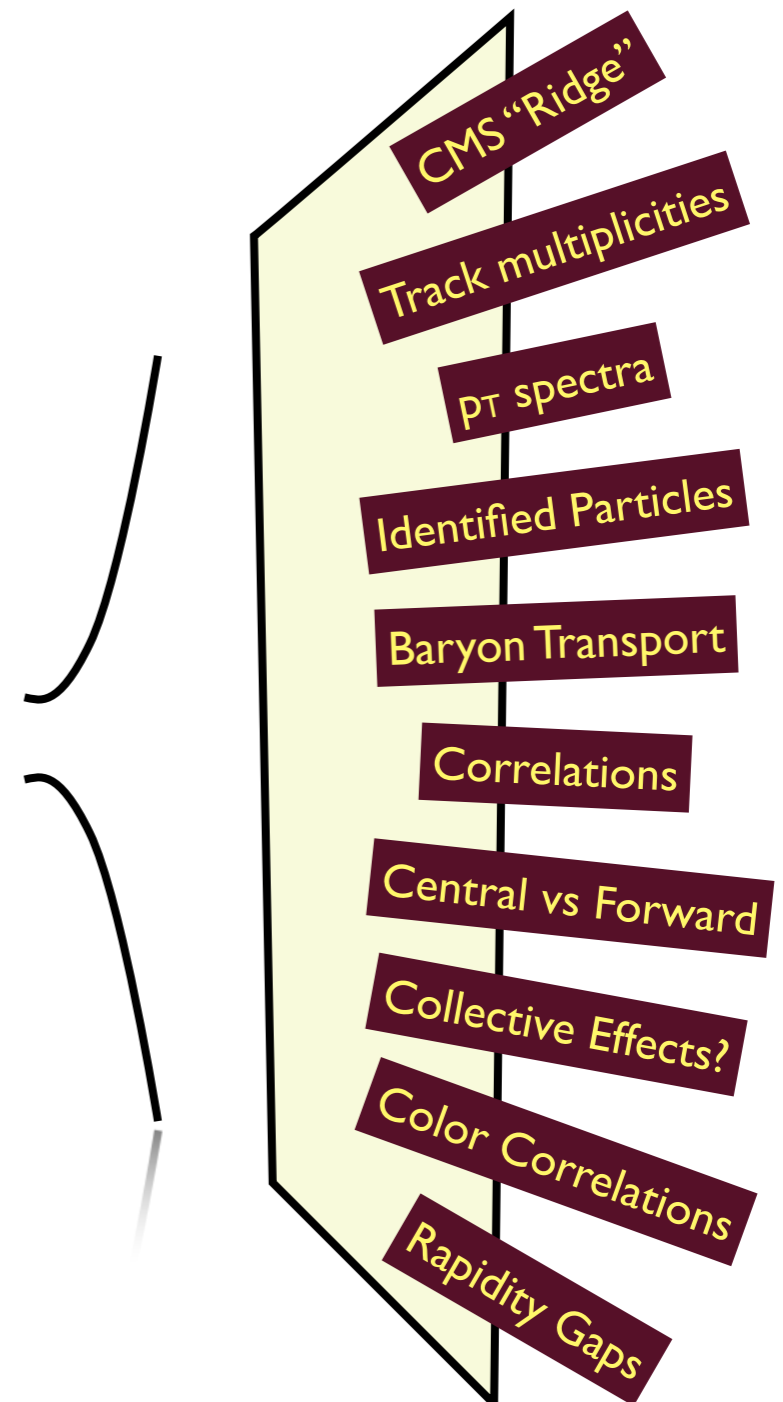
# Early LHC Data



# Early LHC Data

## Minimum-Bias

~ All collisions with  $\geq 1$  track

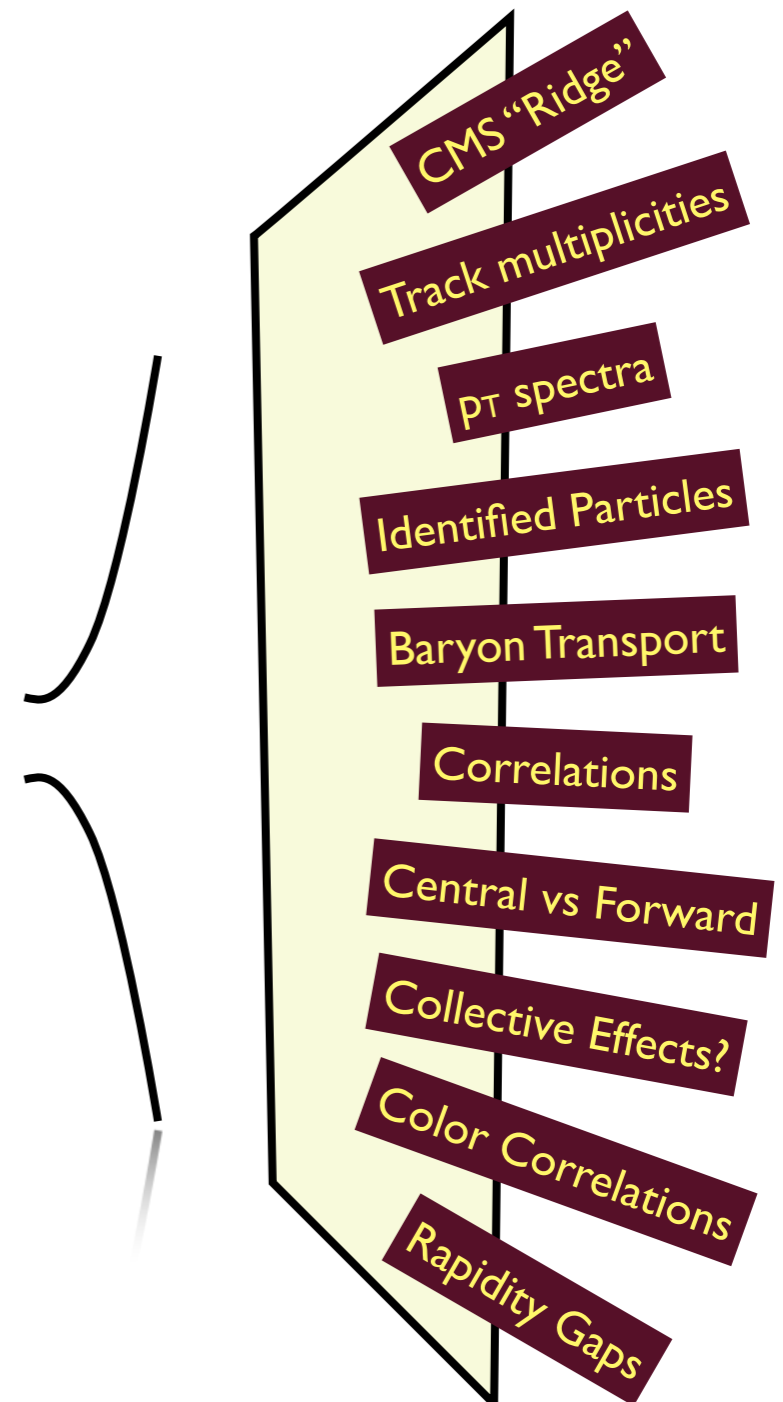


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**It's a simple question:**  
What does the *average*  
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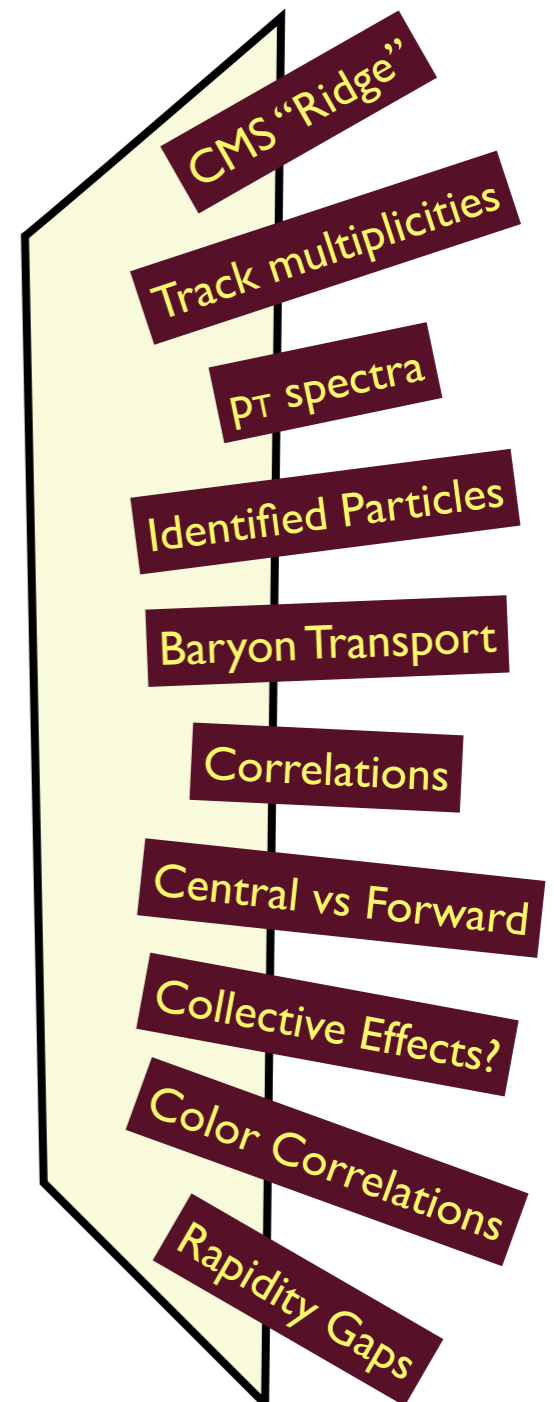
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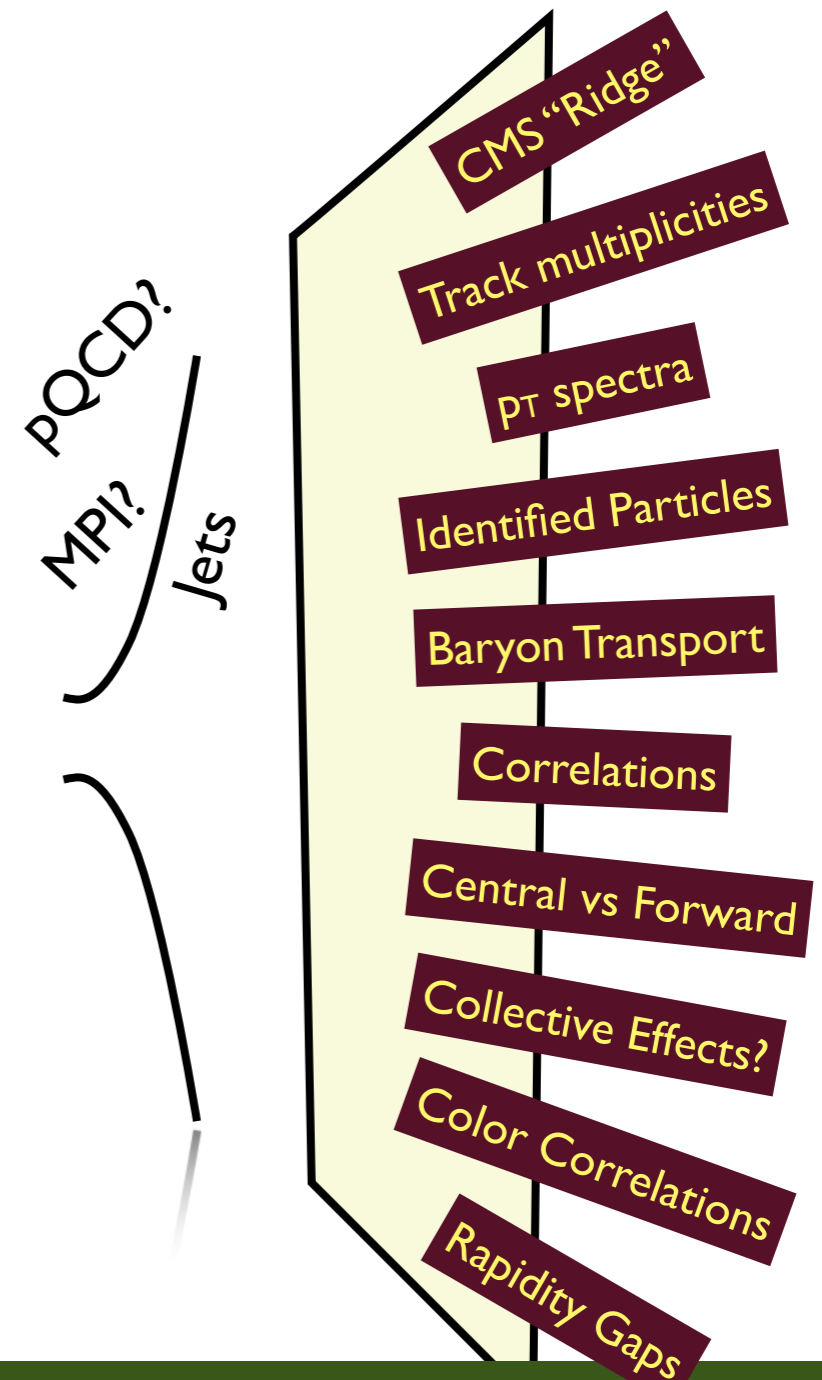
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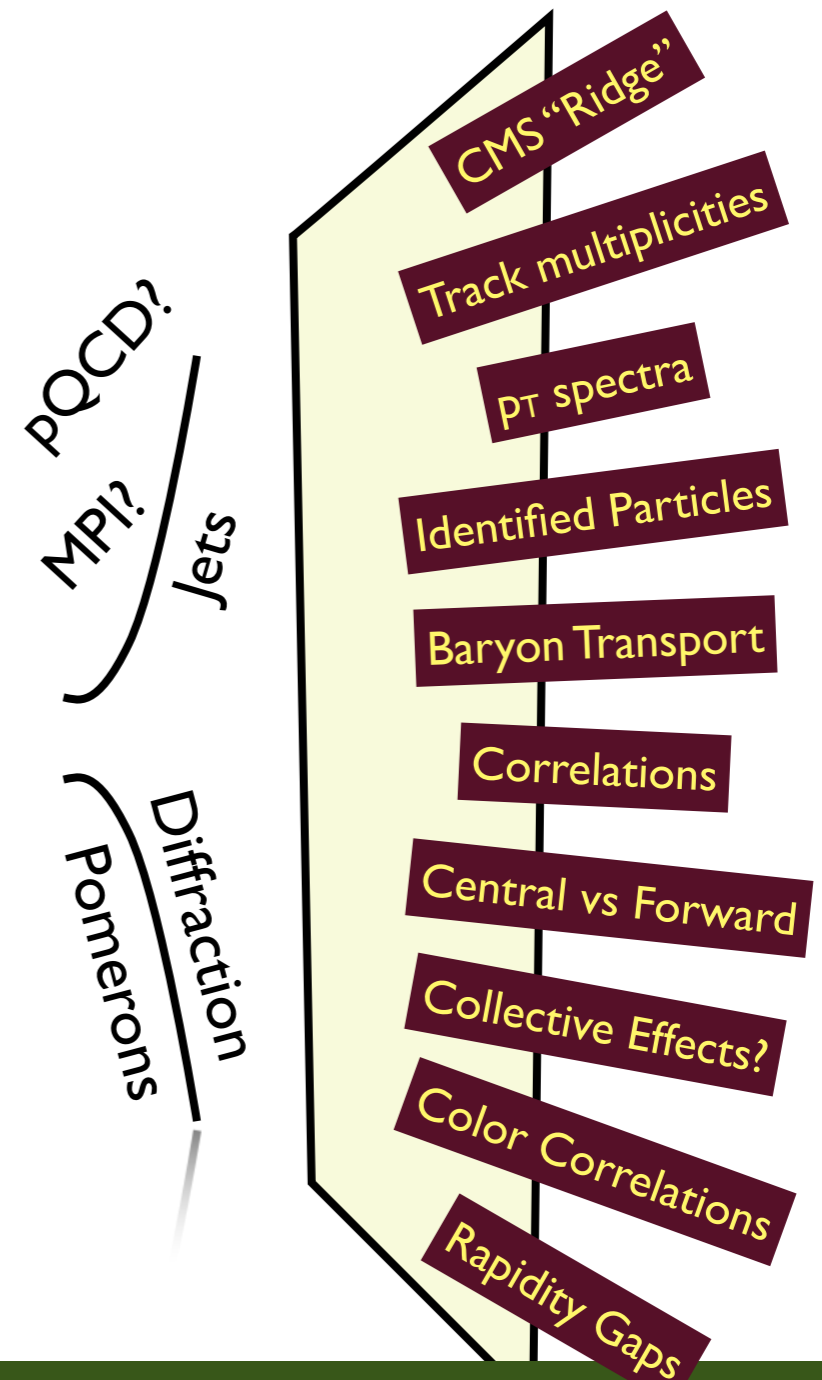
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+ universality → can constrain models and re-use for hard processes

