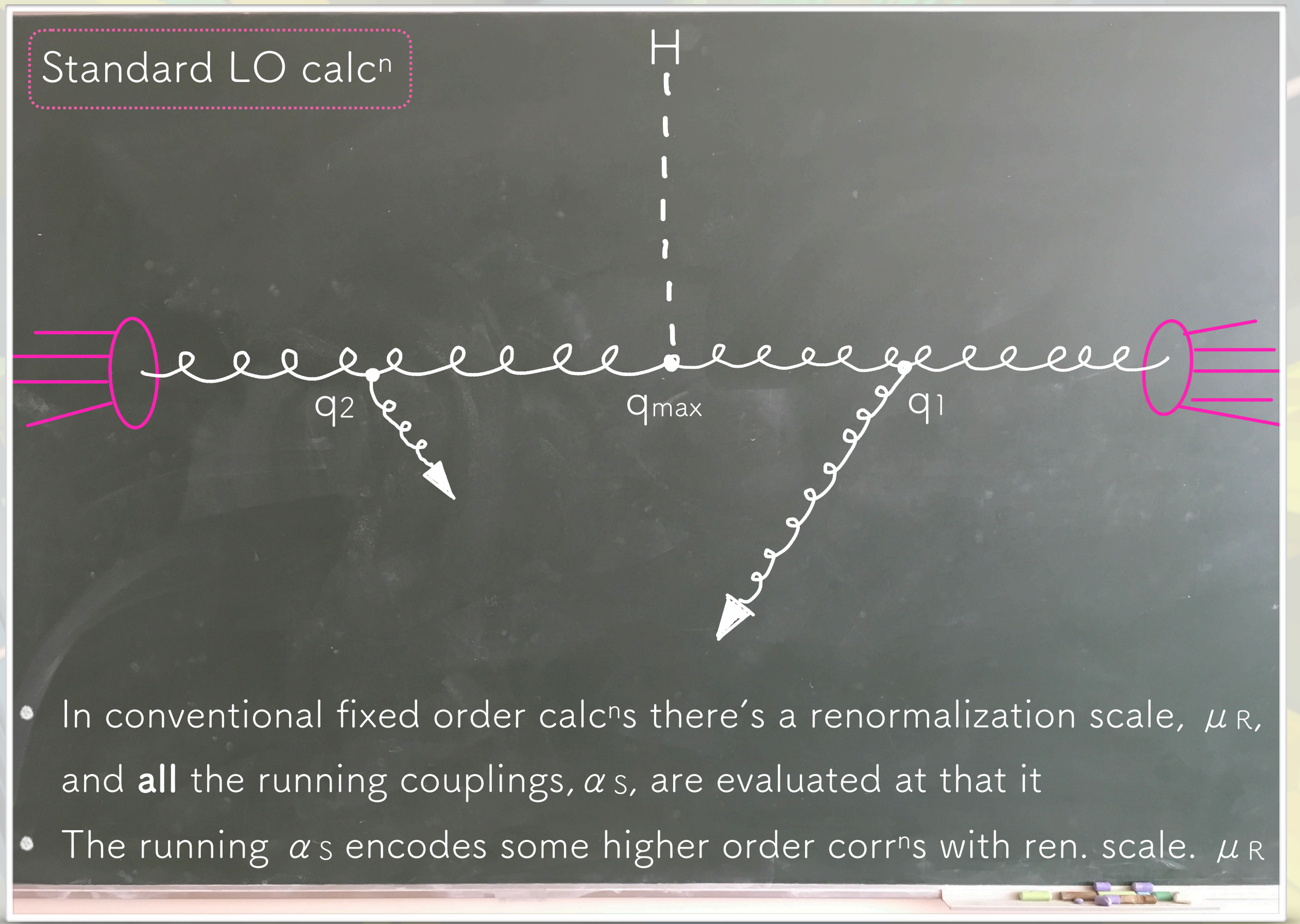
Example: H+2 jets MiNLO at leading order with a broad brush



- In conventional fixed order calcⁿs there's a renormalization scale, μ_R, and **all** the running couplings, α_S, are evaluated at that it
- The running α_S encodes some higher order corrⁿs with ren. scale. μ_R

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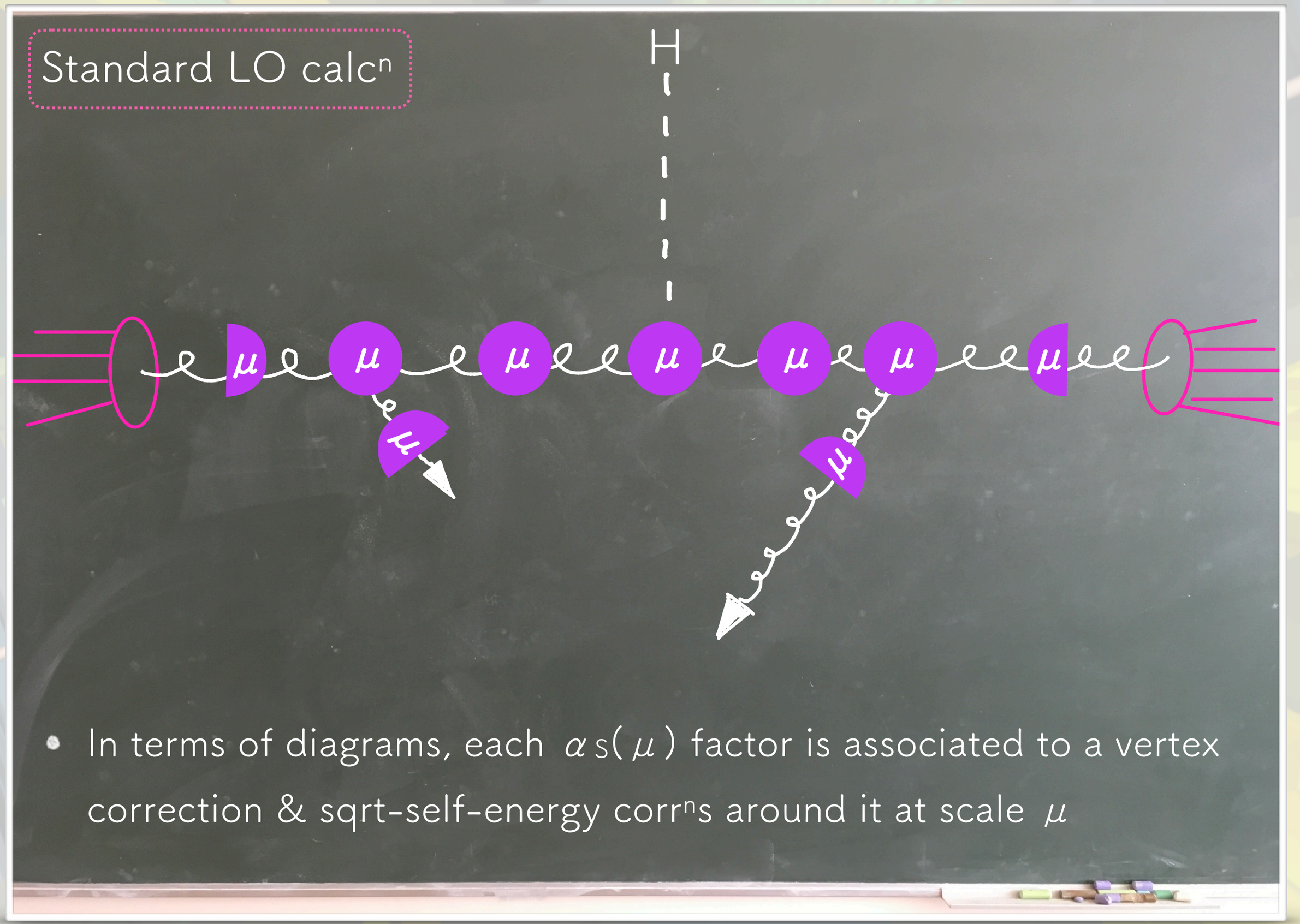
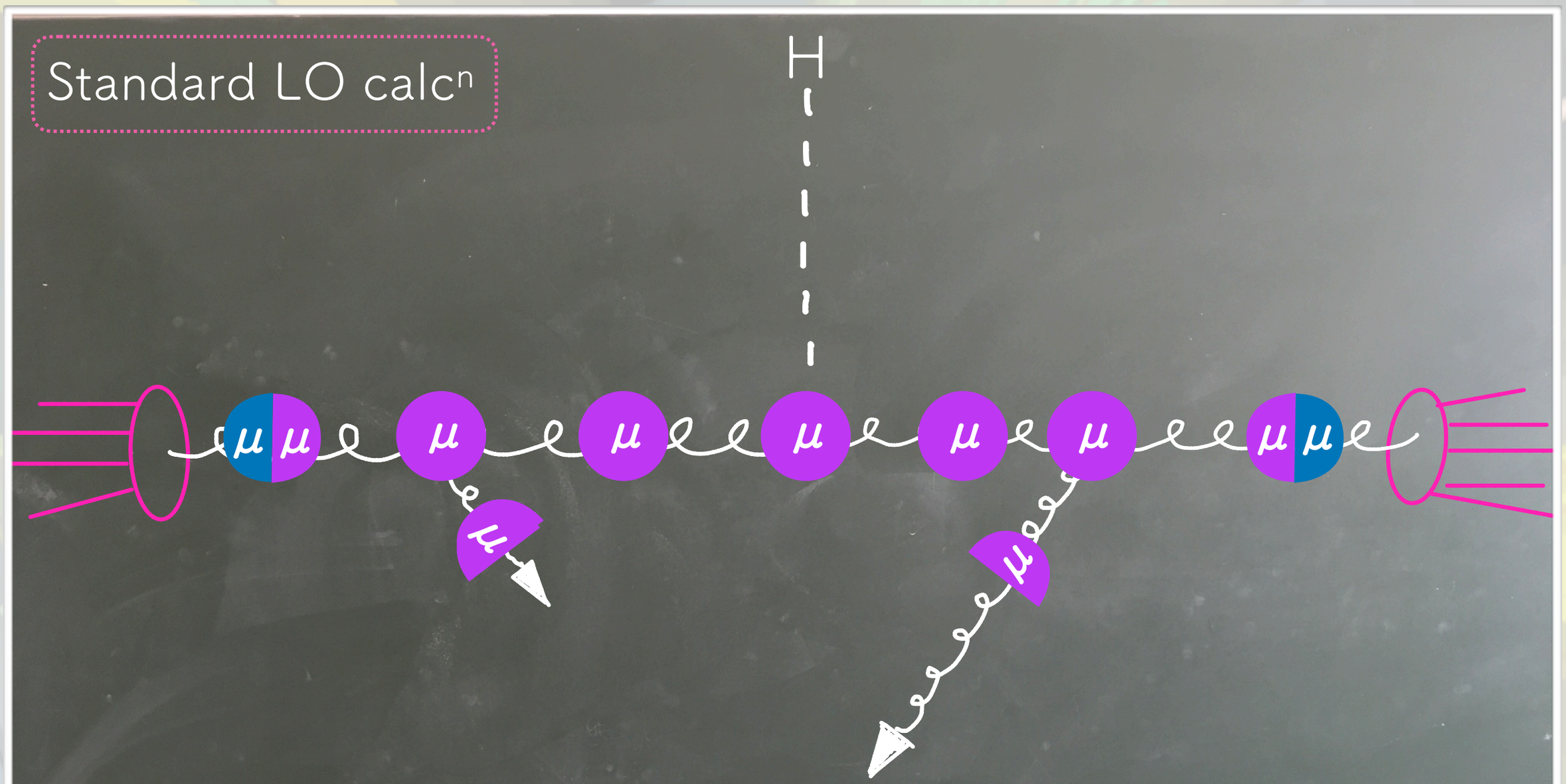


Example: H+2 jets MiNLO at leading order with a broad brush

Standard LO calc^{n}

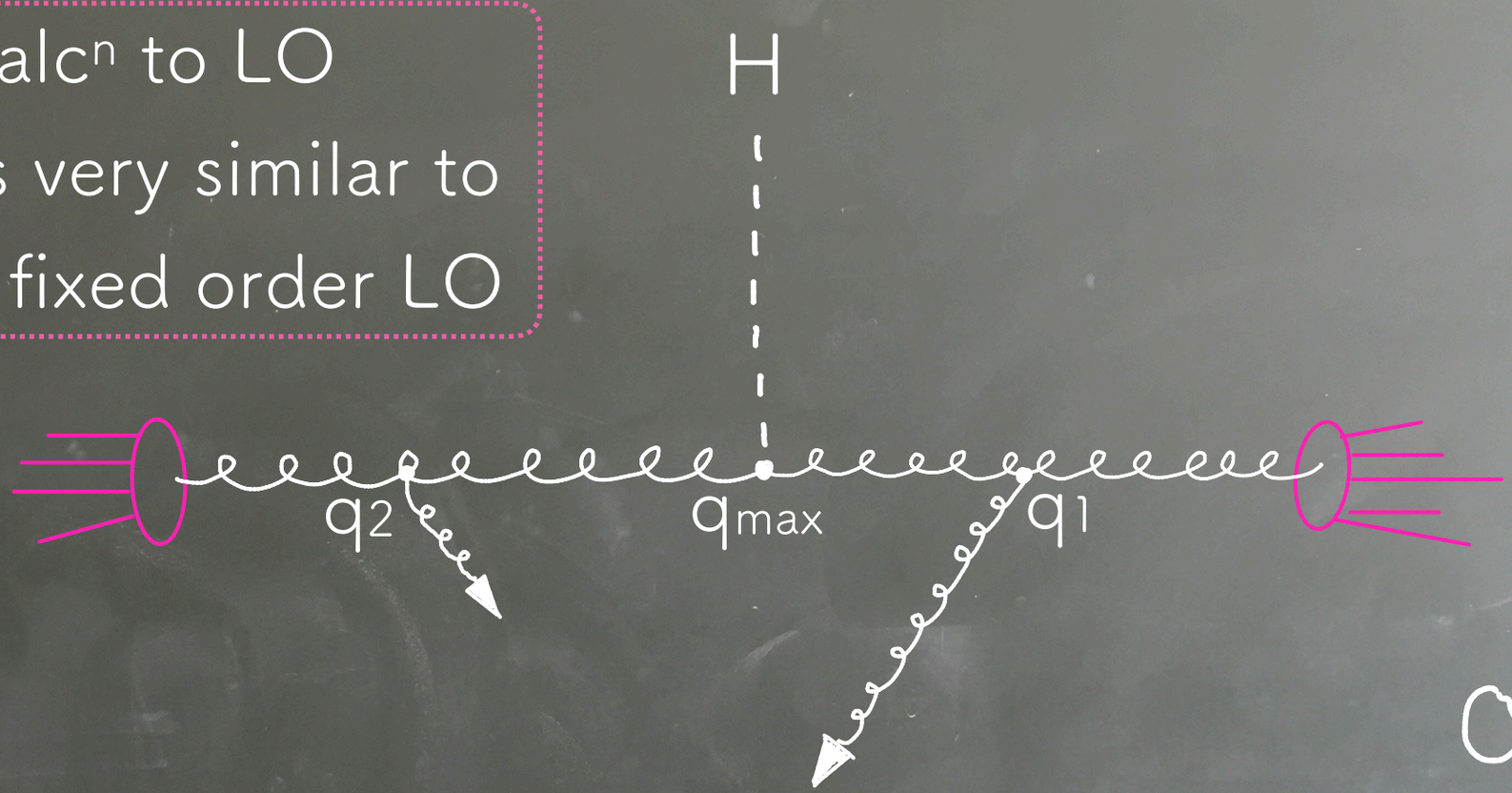


- PDF factorisation scale is often set equal to the ren. scale
- Can be thought of as a sort of renormalization scale for radiative corr^{n}s associated to the incoming external legs

Example: H+2 jets MiNLO at leading order with a broad brush

Shower calc^{n} to LO

$O(\alpha_s^4)$ is very similar to standard fixed order LO



$$d\sigma^{P.S.} = dx_1\, dx_2\, d\Phi_{HJJ}\; f_{h_1}(x_1,\mu_F)\, f_{h_2}(x_2,\mu_F)\; \frac{1}{2\hat{s}}\; \overbrace{M^{P.S.}(\Phi_{HJJ})}^{O(\alpha_s^4)}$$

Integrate over incoming momentum fractions

Phase space for HJJ

PDFs

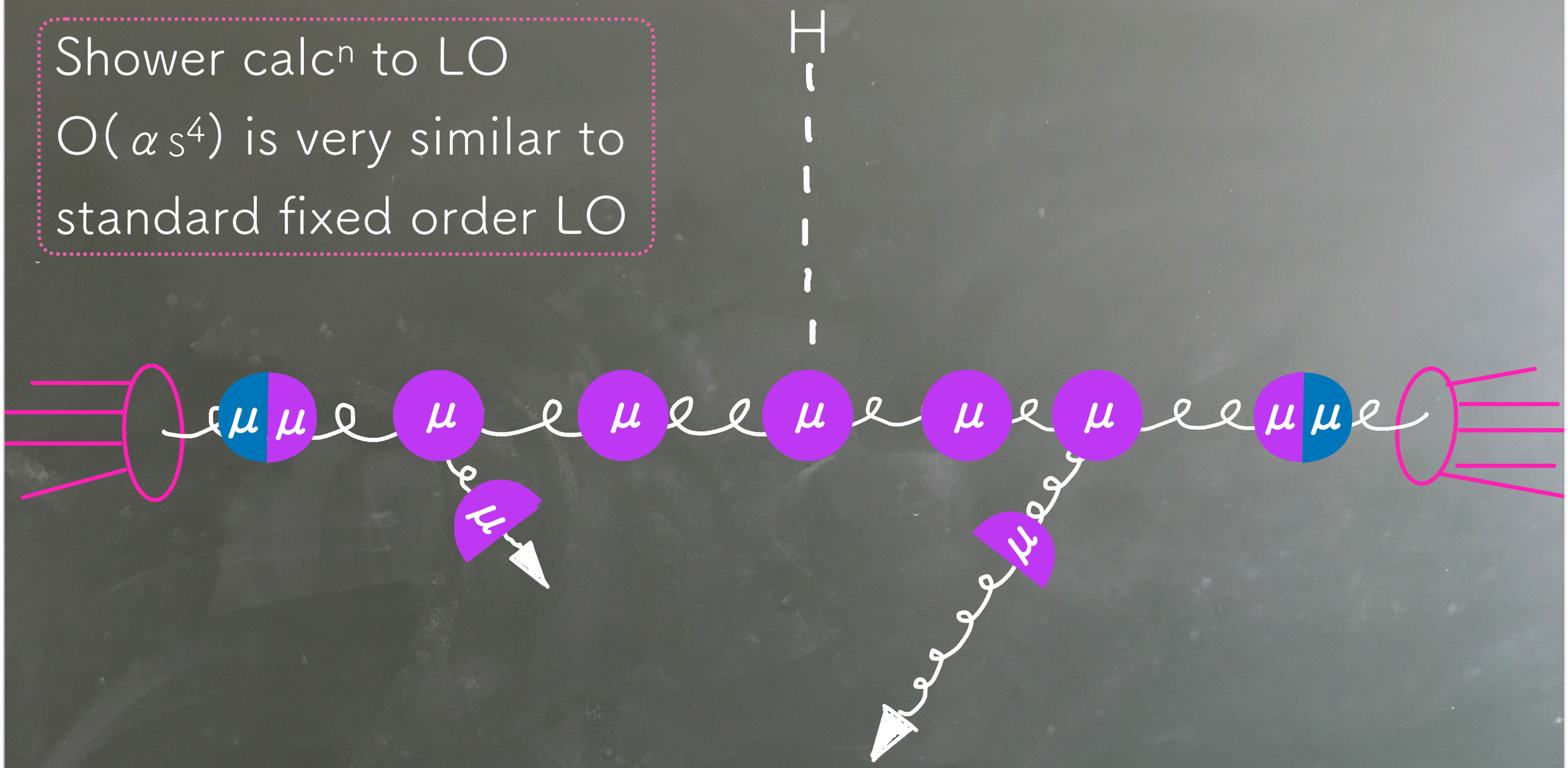
Flux factor

matrix element for HJJ in small angle approx

Example: H+2 jets MiNLO at leading order with a broad brush

Shower calcⁿ to LO

$O(\alpha_s^4)$ is very similar to standard fixed order LO



- Emissions strongly ordered in hardness factorise from one another
- In PS each branching is like its own <u>simple</u> process with own scale
- Evaluating each $\alpha_s(\mu)$ associated to a branching vertex at branching's own p_T sums large class of higher order corrⁿs

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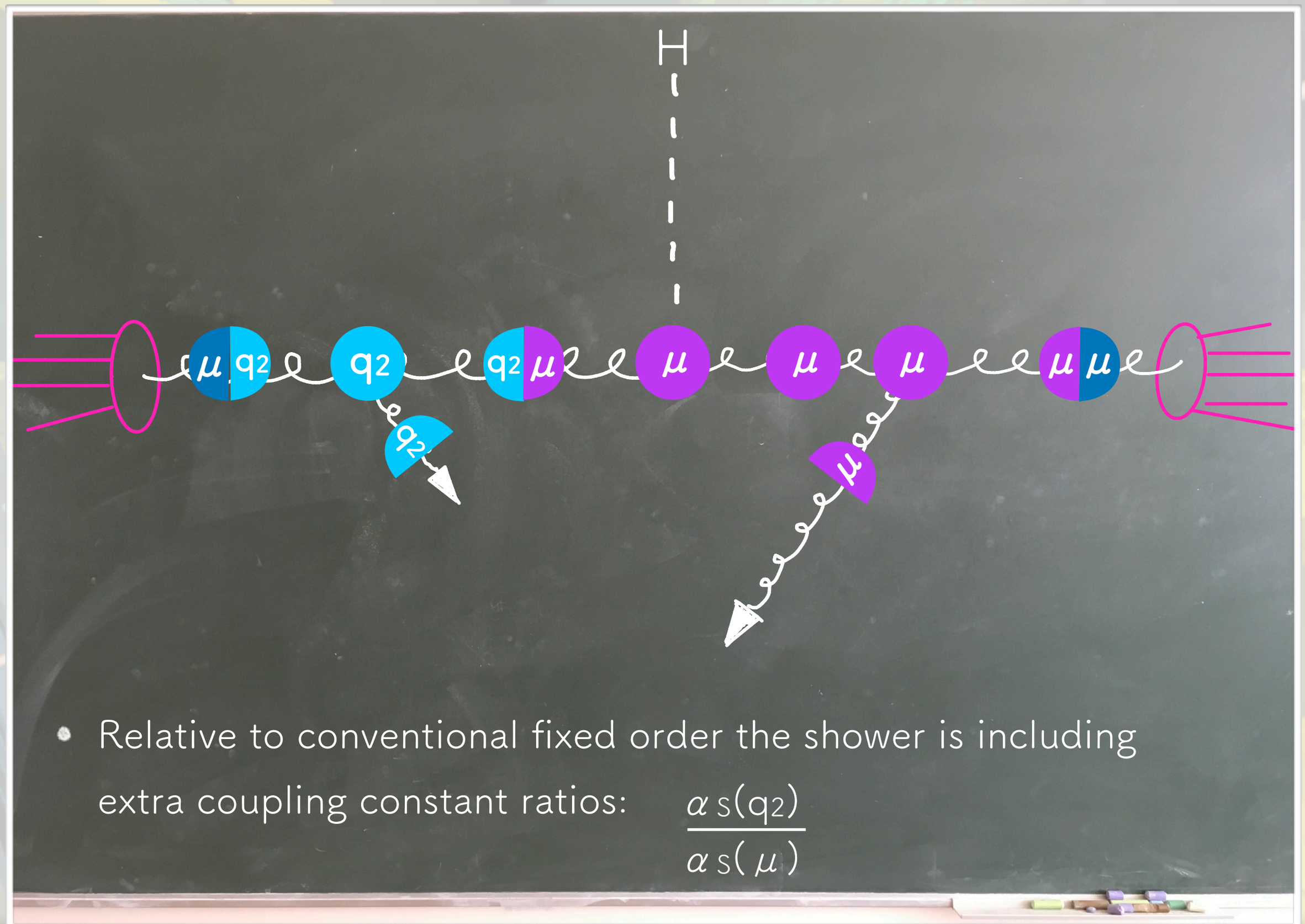
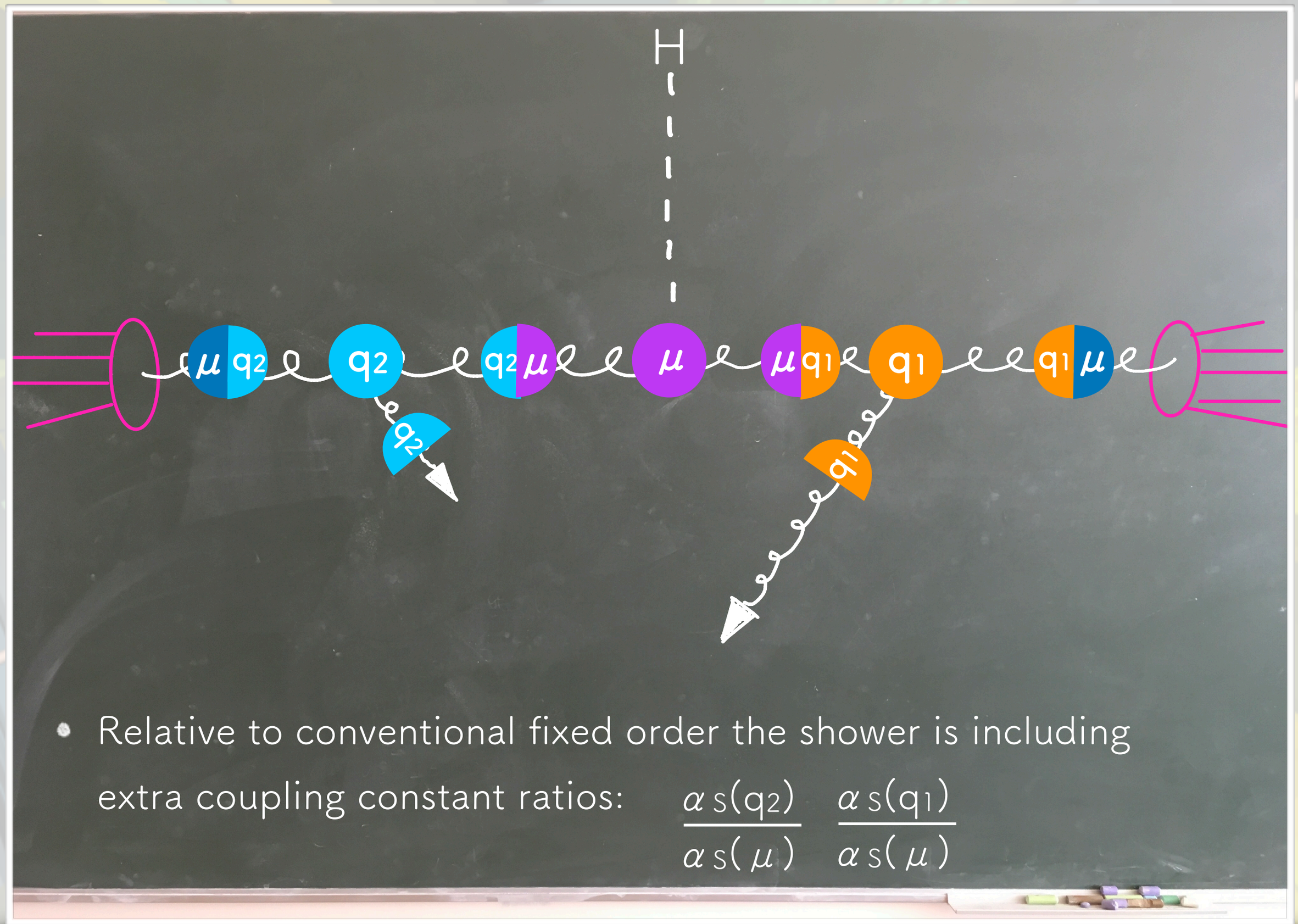


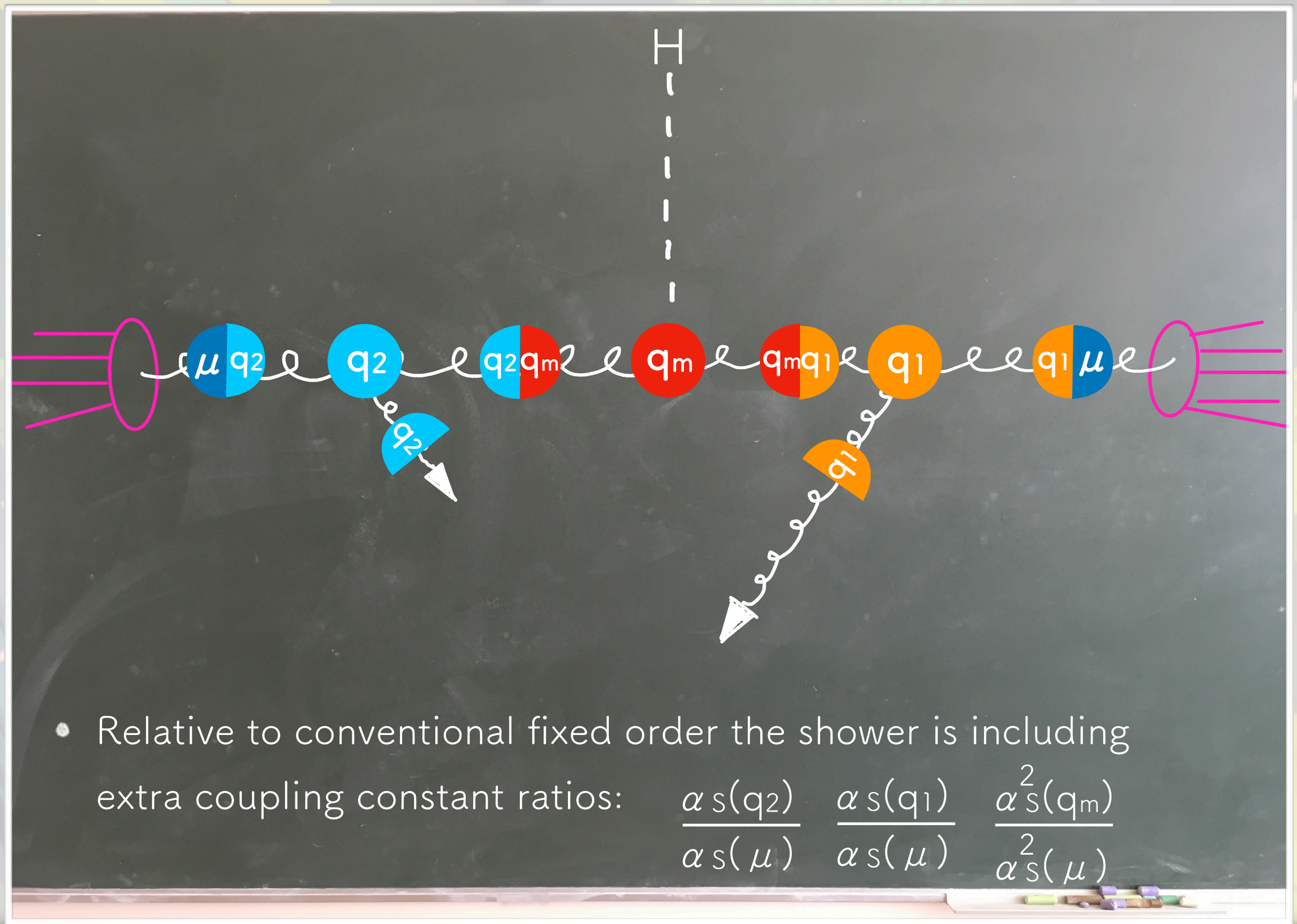
- Relative to conventional fixed order the shower is including extra coupling constant ratios: $\frac{\alpha_s(q_2)}{\alpha_s(\mu)}$

Example: H+2 jets MiNLO at leading order with a broad brush



- Relative to conventional fixed order the shower is including extra coupling constant ratios: $\frac{\alpha_s(q_2)}{\alpha_s(\mu)}$ $\frac{\alpha_s(q_1)}{\alpha_s(\mu)}$

Example: H+2 jets MiNLO at leading order with a broad brush



- Relative to conventional fixed order the shower is including extra coupling constant ratios: $\frac{\alpha_s(q_2)}{\alpha_s(\mu)}$ $\frac{\alpha_s(q_1)}{\alpha_s(\mu)}$ $\frac{\alpha_s^2(q_m)}{\alpha_s^2(\mu)}$

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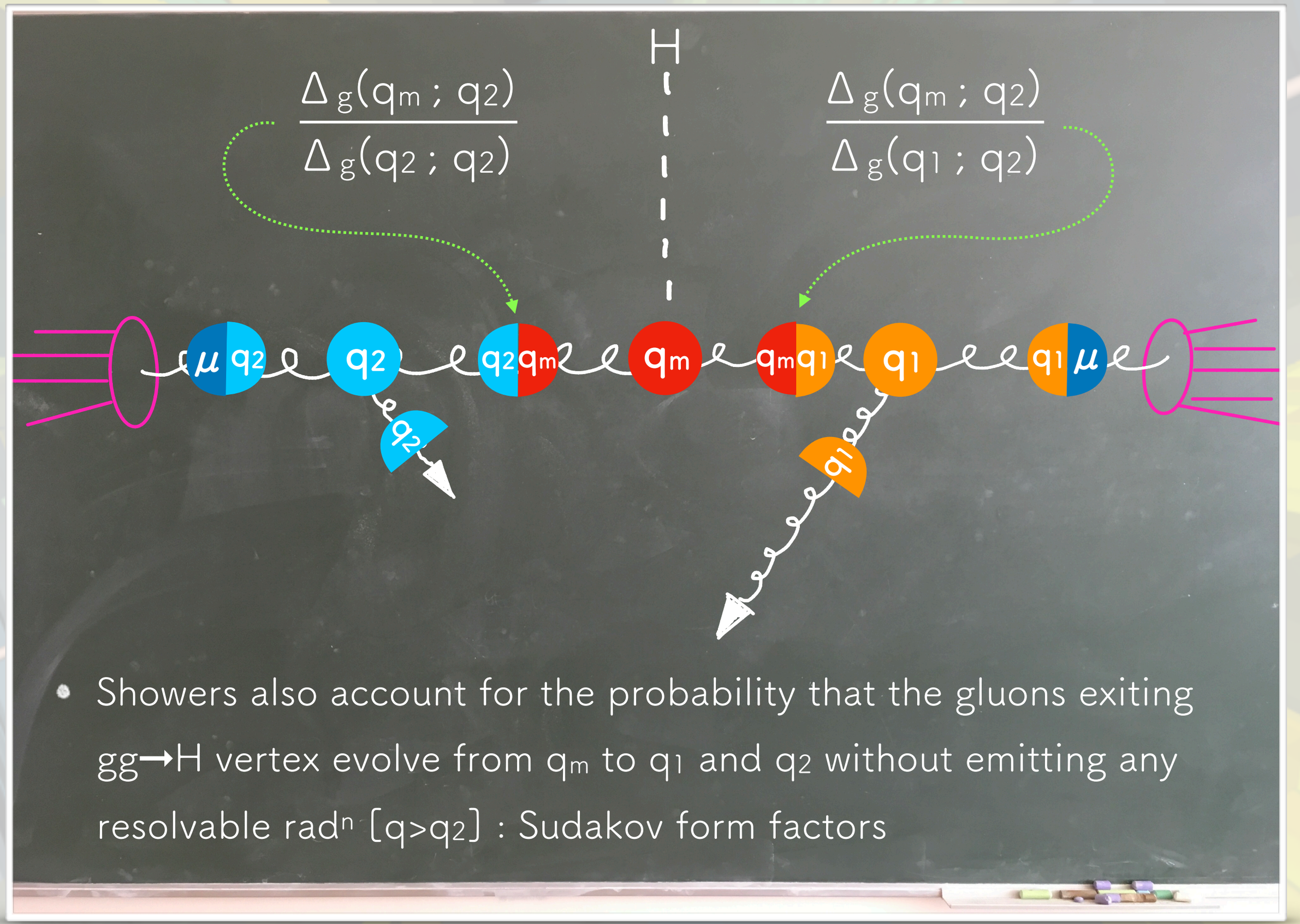

- Showers also account for the probability that the gluons exiting $gg \rightarrow H$ vertex evolve from q_m to q_1 and q_2 without emitting any resolvable rad^n [$q > q_2$] : Sudakov form factors

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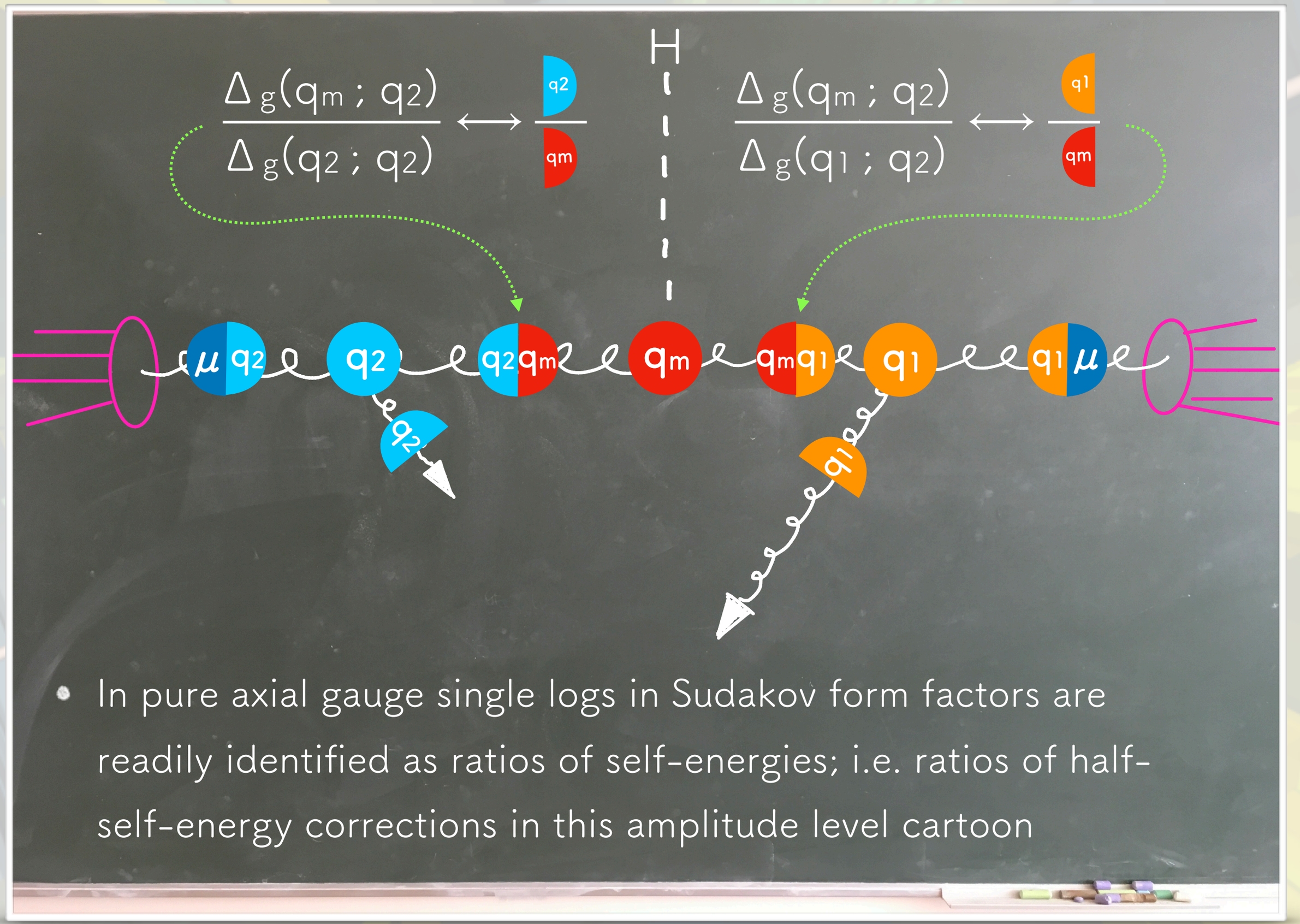

- In pure axial gauge single logs in Sudakov form factors are readily identified as ratios of self-energies; i.e. ratios of half-self-energy corrections in this amplitude level cartoon

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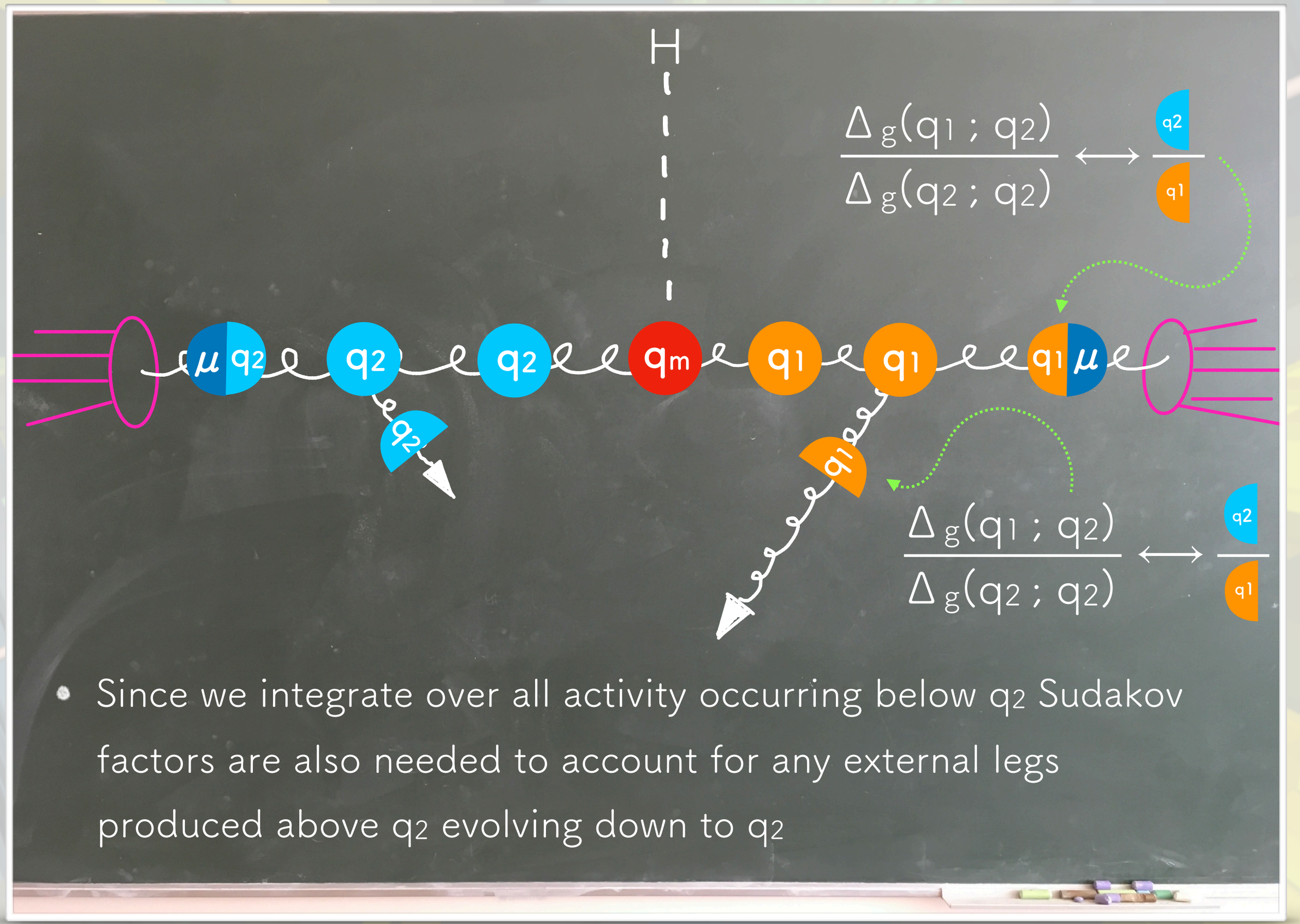

- Since we integrate over all activity occurring below q_2 Sudakov factors are also needed to account for any external legs produced above q_2 evolving down to q_2