Slides for Round-table Discussion

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Models of J/ψ photo-production

Models in the market

1. Pomeron exchange model (Pom-DL)
2. Pomeron + J/ψ-N potential model (Pom-pot)
3. GPD-based model
4. 2-gluons & 3-gluons exchange model (2g+3g)
5. Holographic approach
6. Pomeron + CQM

With those background, investigate

- N^* (P_c) contributions

Model IV

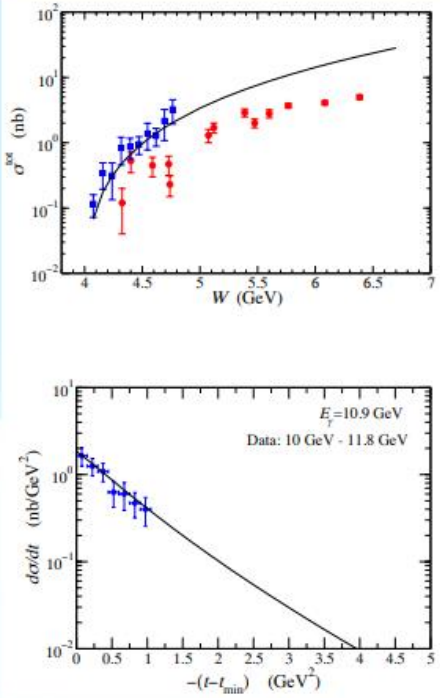


Fig. 19 *GPD*-based model. Upper: total cross sections, Lower: differential cross sections.

Model V

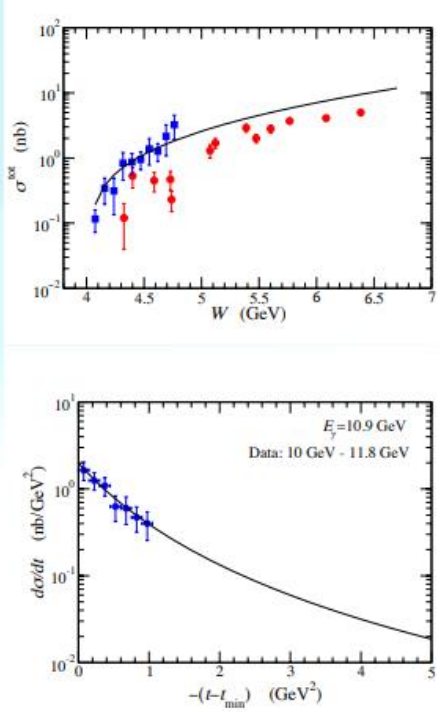


Fig. 20 *Holog* model. Upper: total cross sections; Lower: differential cross sections.

Model VI

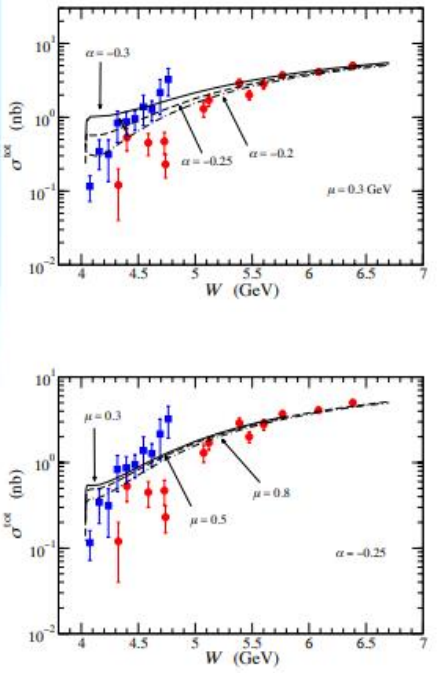


Fig. 27 Dependence of the total cross sections on the parameter α (upper) and μ (lower) of the quark-nucleon potential $v_{cN} = \alpha \frac{e^{-\mu r}}{r}$ within the *Pom*-CQM model.

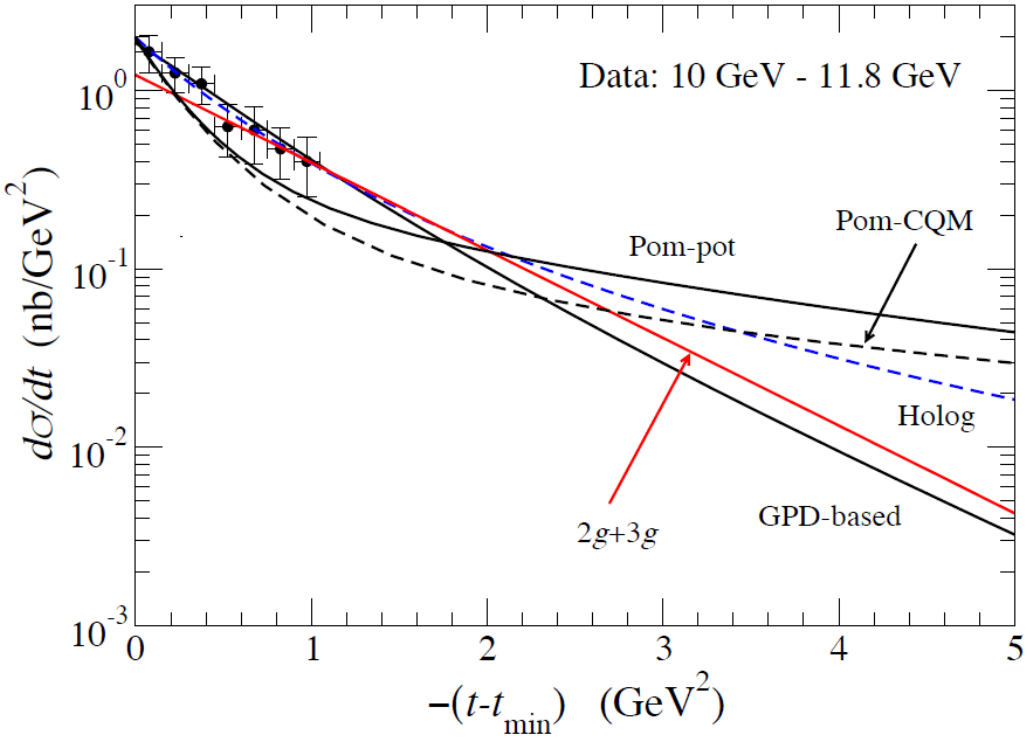
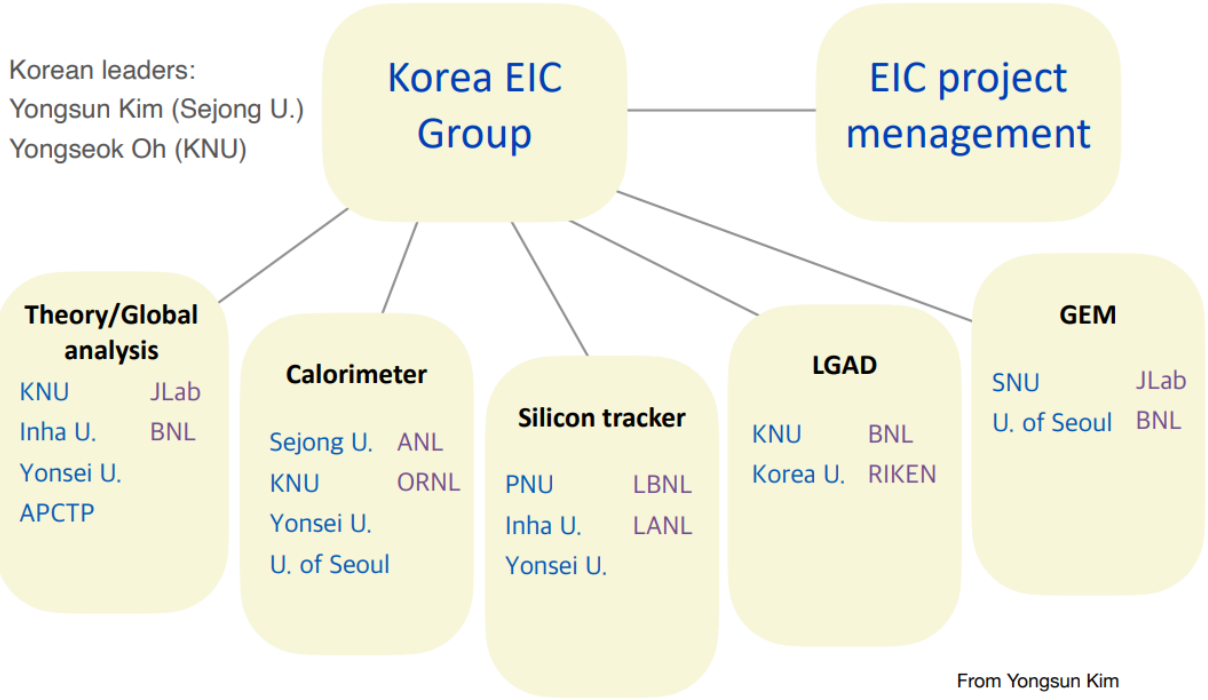


Fig. 30 Comparison of the differential cross sections from the five models presented in this paper.

Proposed partnership w/ international collab.

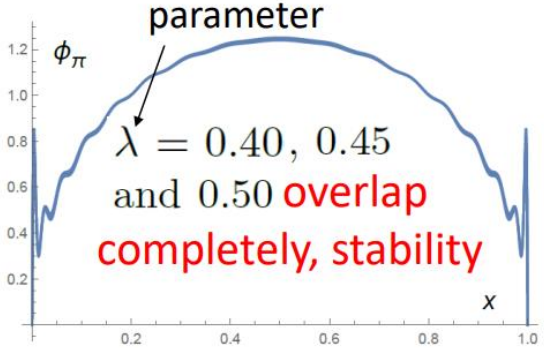
Expected manpower: ~10 universities, ~ 50 members (including ~15 faculty members)

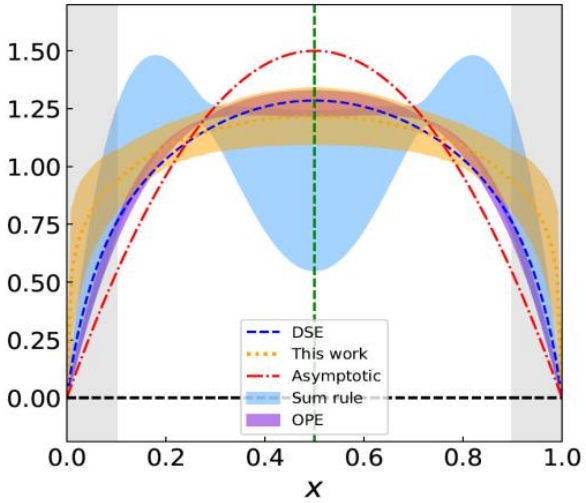


From Yongsun Kim

x dependence

- Sum over 18 Gegenbauer coefficients





- Fit to parametrization

$$\frac{\Gamma(2p+2)}{\Gamma(p+1)^2}x^p(1-x)^p, \quad p = 0.45 \pm 0.02,$$

from variation of λ

Hua et al 2021
from quasi-correlator

GPD with pion beams at J-PARC

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Accessing proton generalized parton distributions and pion distribution amplitudes with the exclusive pion-induced Drell-Yan process at J-PARC

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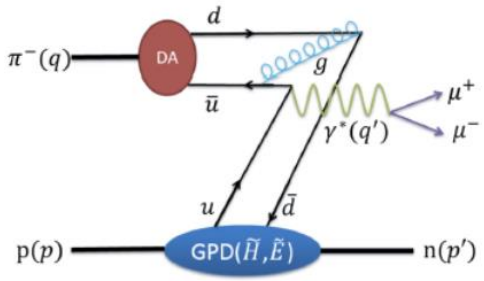


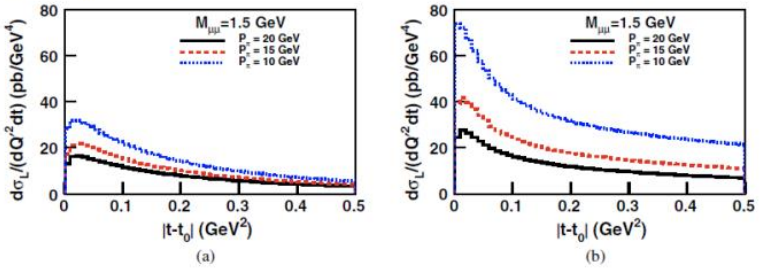
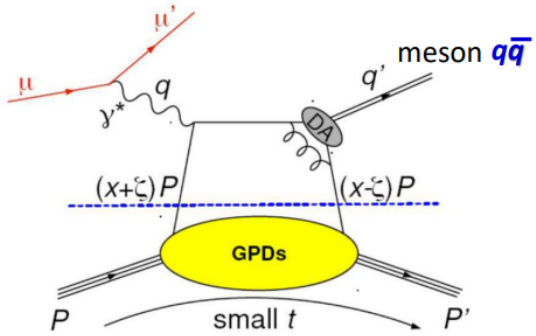


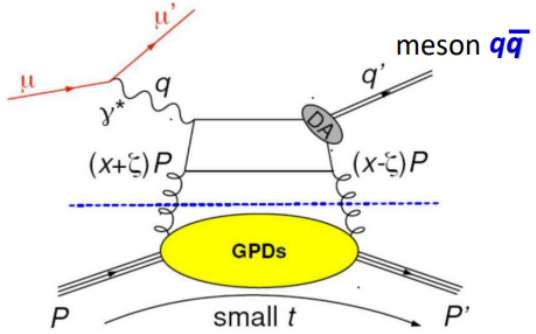
FIG. 10. Differential cross sections of exclusive Drell-Yan events, Eq. (20), as a function of $|t - t_0|$ at $M_{\mu^+\mu^-} = 1.5$ GeV for $P_\pi = 10$, 15, and 20 GeV with the input GPDs: (a) BMP2001 and (b) GK2013.

Deeply Virtual Meson Production (DVMP)

quark contribution



gluon contribution



4 chiral-even GPDs: helicity of parton unchanged

$H^q(x, \xi, t)$ $E^q(x, \xi, t)$
$\tilde{H}^q(x, \xi, t)$ $\tilde{E}^q(x, \xi, t)$

+ 4 chiral-odd or transversity GPDs: helicity of parton changed

$H_T^q(x, \xi, t)$ $E_T^q(x, \xi, t)$
$\tilde{H}_T^q(x, \xi, t)$ $\tilde{E}_T^q(x, \xi, t)$

$$\overline{E}_T^q = 2\,\tilde{H}_T^q + E_T^q$$

- Ability to probe the chiral-odd GPDs.
- Additional non-perturbative term from meson wave function → more difficult for GPD extraction
- In addition to nuclear structure, provide insights into reaction mechanism

$$\left\langle r_\perp^2(x_B)\right\rangle \approx 2B(x_B)$$ At small x_B