

Medium-induced modification of kaons spectra measured in SIDIS at HERMES

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(on behalf of the HERMES collaboration)

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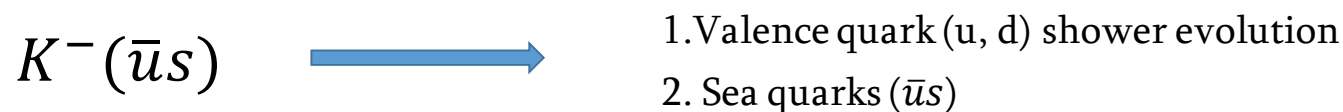
Theoretical motivation

Data

Results

Conclusion

How K^- can form ?



How K^- spectra can enhance ?

Medium-induced flavor conversion (large x_{Bj} & z)!



Nuclear Modification Factor

The nuclear modification factor for the hadron spectra is defined in term of ratio of hadrons yields per DIS event for a nuclear target A to this for a deuterium target D.

$$R_{A/D}^h(x_{Bj}, z, p_t^2, \dots) = \frac{\left(\frac{N^h(x_{Bj}, z, p_t^2, \dots)}{N^e(x_{Bj}, z, p_t^2, \dots)}\right)_A}{\left(\frac{N^h(x_{Bj}, z, p_t^2, \dots)}{N^e(x_{Bj}, z, p_t^2, \dots)}\right)_D}$$

x_{Bj} : fraction of the nucleon's momentum carried by the struck quark (Bjorken variable)

z : hadron fractional energy

p_t : transfers momentum of produced hadrons

N^e : number of DIS electrons

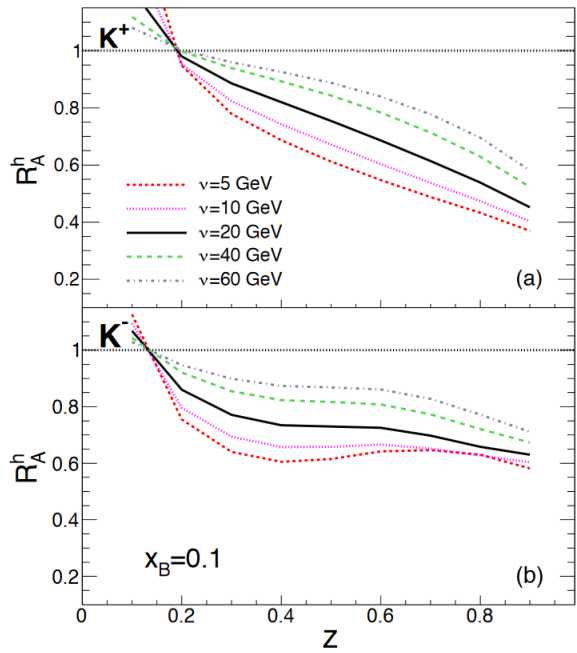
N^h : number of SIDIS (Semi Inclusive Deep Inelastic Scattering) hadrons

Theoretical prediction

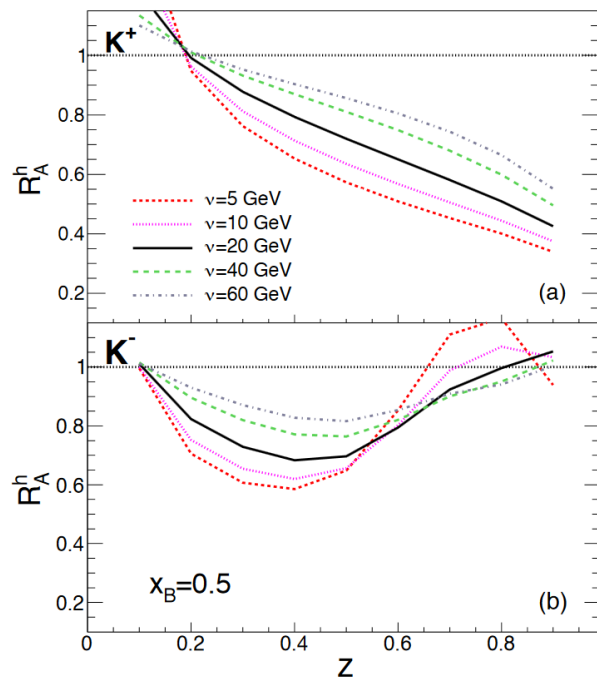
Medium-induced flavor conversion and kaon spectra in electron-ion collisions

Ning-Bo Chang, Wei-Tian Deng and Xin-Nian Wang, e-Print: arXiv:1411.7007

[hep-ph], Nov. 25, 2014; Phys.Rev. C92 (2015) no.5, 055207

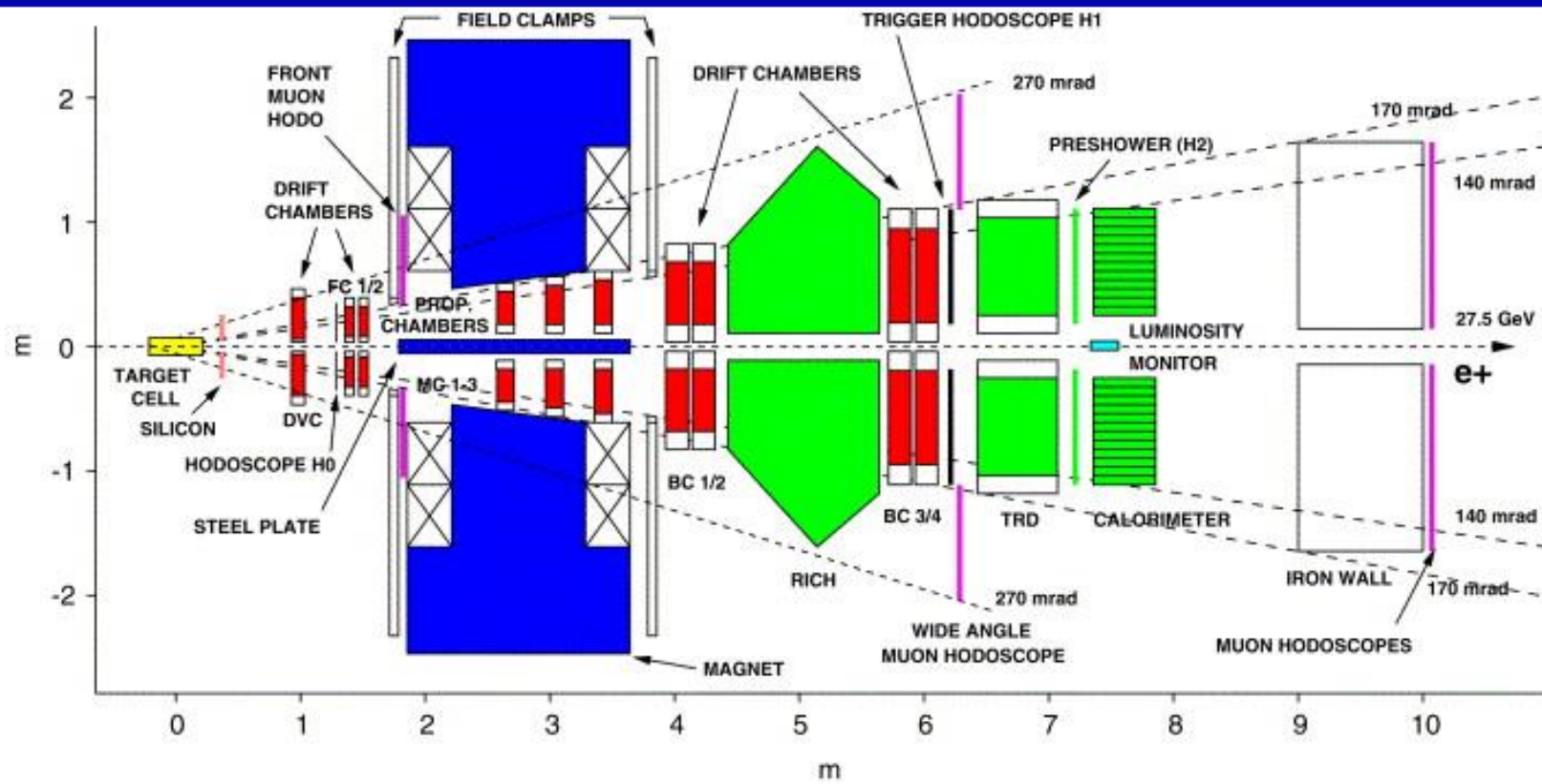


The nuclear modification factor for (a) K^+ and (b) K^- for different initial quark energy in SIDIS at $x_{Bj} = 0.1$



The nuclear modification factor for (a) K^+ and (b) K^- for different initial quark energy in SIDIS at $x_{Bj} = 0.5$

HERMES spectrometer



Energy of beam(e^+ , e^-) 27.5[GeV]

Geometric acceptance: ± 170 mrad horizontally plane and 40-140 mrad vertically plane

Momentum resolution: $\Delta p/p \sim 0.7-1.7\%$

Angular resolution: $\Delta\theta/\theta \sim 0.5\%$

Targets (pure gaseous): H, D, Ne, Kr, Xe

Data from Hermes

Targets: D , Ne , Kr and Xe



Data selection

1. $Q^2 > 1[GeV^2]$; $W^2 > 10[GeV^2]$
2. $2 < p_h < 15 [GeV]$
3. x_{Bj} : $0.023 < 0.1$; $0.1 - 0.15$; $0.15 - 0.25$; $0.25 - 0.35$; $0.35 - 0.41$
4. z : $0.2 - 0.3$; $0.3 - 0.4$; $0.4 - 0.55$; $0.55 - 1.2$

Data from Hermes

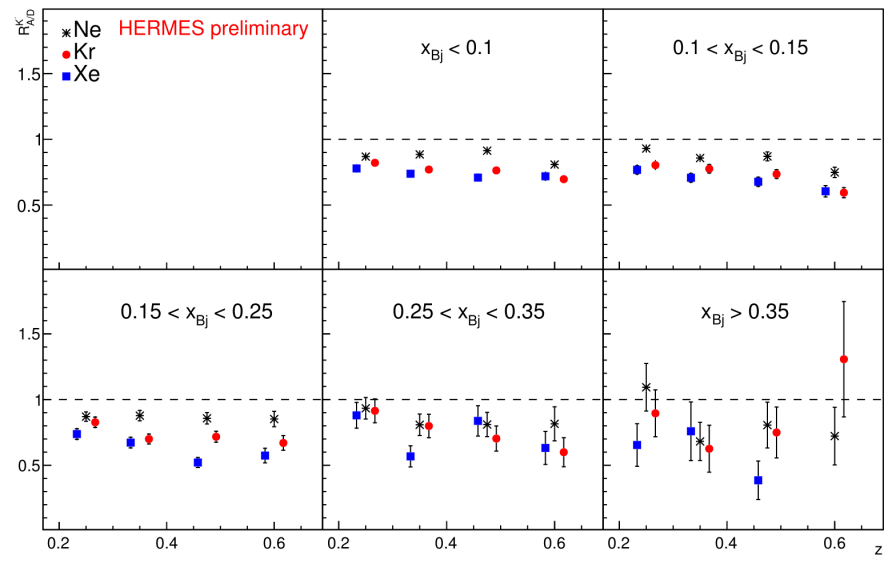
Targets: D , Ne , Kr and Xe



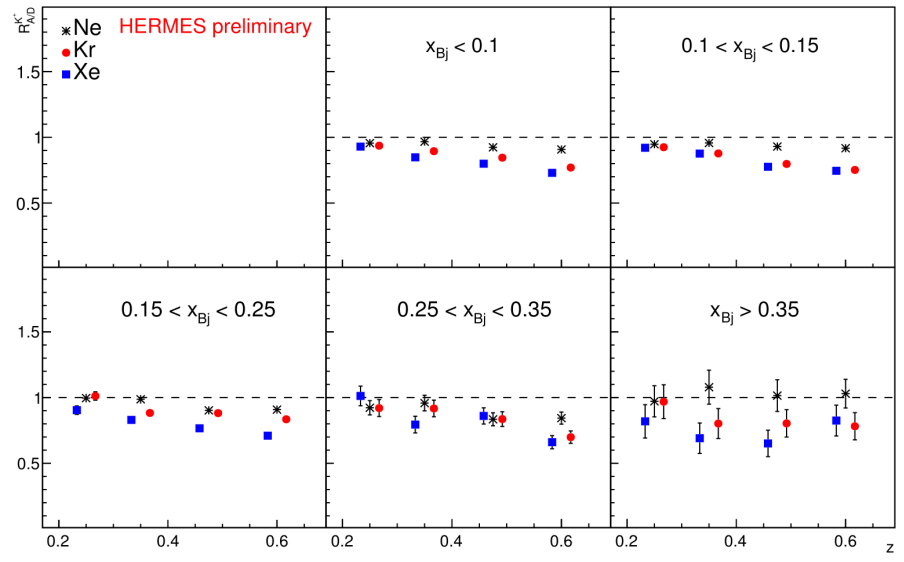
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Results

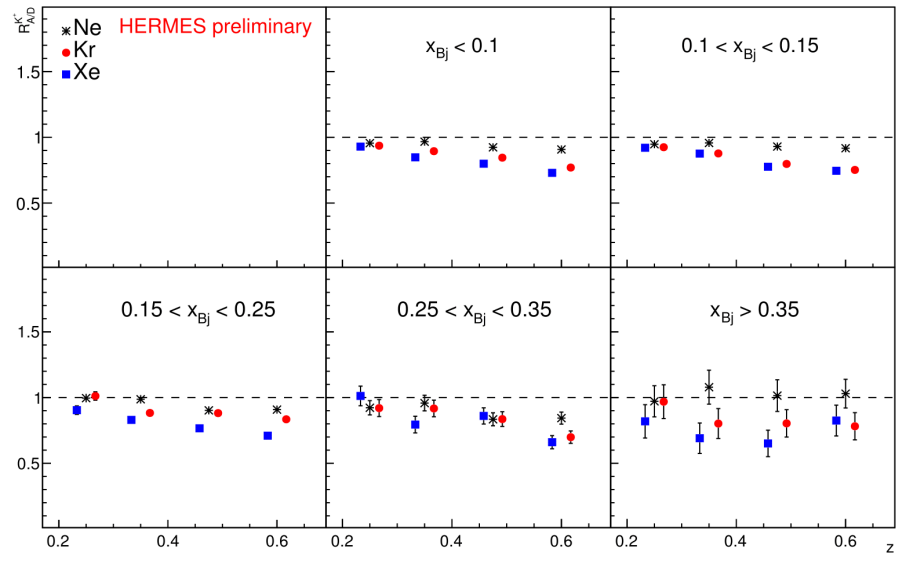
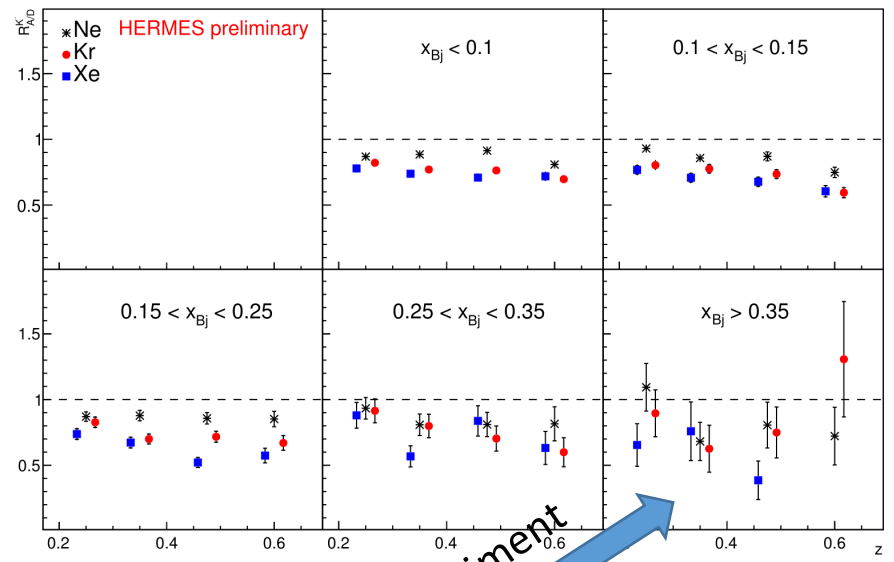


The $R_{A/D}^h(z)$ ratios at five x_{Bj} slices for negatively charged kaons



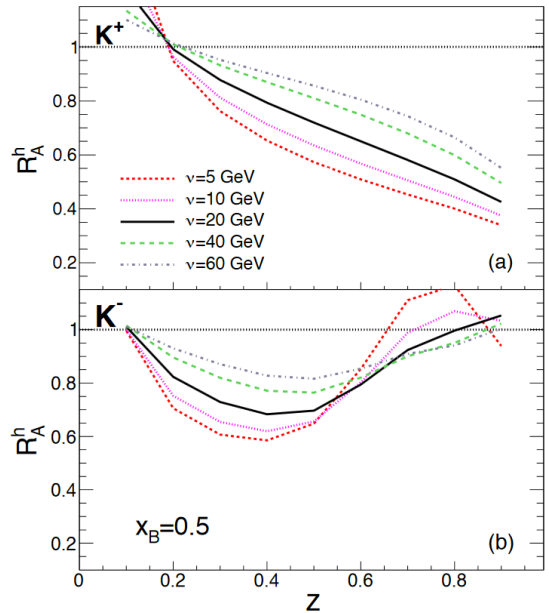
The $R_{A/D}^h(z)$ ratios at five x_{Bj} slices for positively charged kaons

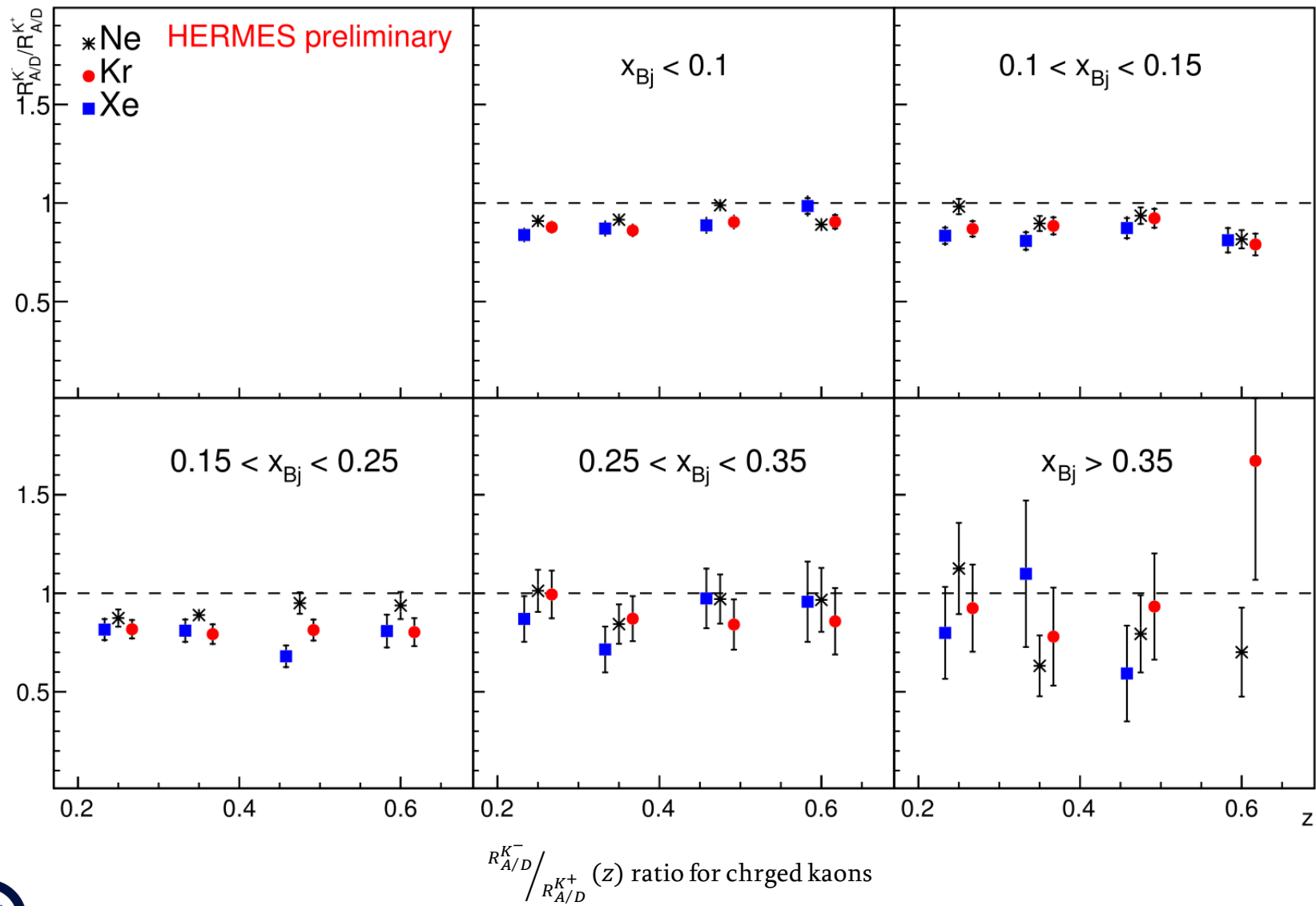
Results



Experiment

Theory

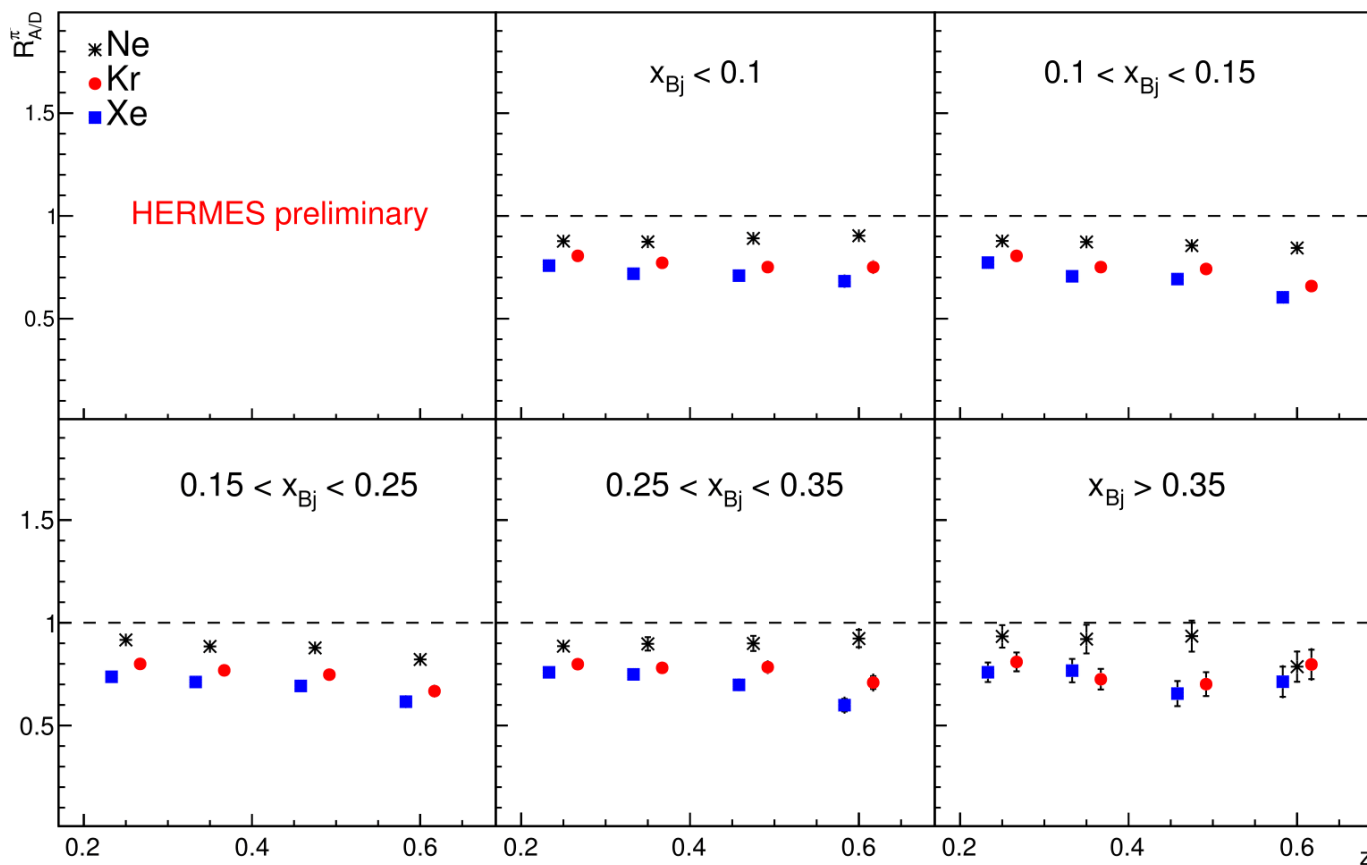




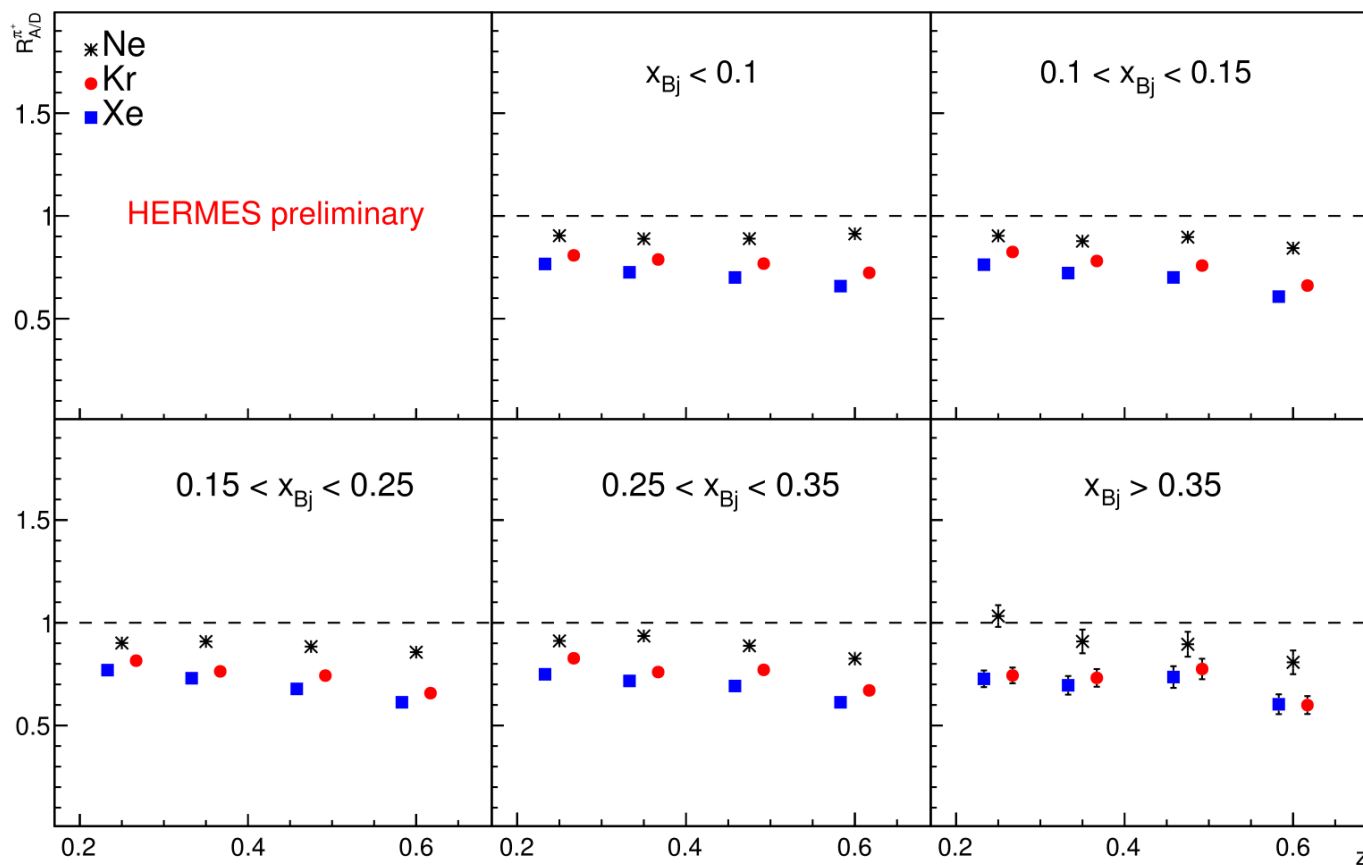
1. For K^- in case of Kr target at x_{Bj} greater than 0.35 certain indication of enhancement of the $R_{A/D}^h(z)$ with the increasing of z is observed.

2. Ratio $R_{A/D}^{K^-} / R_{A/D}^{K^+}$ at highest z becomes even greater than unity for Kr .

Thank you for your attention !



The $R_{A/D}^h(z)$ ratios at five x_{Bj} slices for negatively charged pions



The $R_{A/D}^h(z)$ ratios at five x_{Bj} slices for positively charged pions