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On the extraction of Boer-Mulders functions

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At present, the Boer-Mulders (BM) functions are extracted using the simplifying assumption of their proportionality to the Sivers functions. Here we present 2 independent tests for this assumption using the so-called difference asymmetries i.e. the difference between the cross sections for production of particles and their anti-particles.

Then we apply COMPASS data on SIDIS for the $\langle \cos \phi_h \rangle$, $\langle \cos 2\phi_h \rangle$ and Sivers asymmetries to these tests. Our analysis shows that it is compatible with the available data if the proportionality is the same for all quark flavours, which, however, does not correspond to the values obtained in existing analysis. This suggests that the published information on the BM functions may be unreliable. The $\langle \cos \phi_h \rangle$ and $\langle \cos 2\phi_h \rangle$ asymmetries receive contributions also from the, in principle, calculable Cahn effect. We succeed in extracting the Cahn contributions from experiment (we believe for the first time) and compare with their calculated values. Surprisingly, the calculated values agree with the extracted ones only for the old experimental values $\langle k^2_T \rangle = 0.18 \text{ GeV}^2$ and $\langle k^2_T \rangle = 0.25 \text{ GeV}^2$ and completely disagree with the much bigger present-day values. The results are based on paper arXiv:1705.10613

Presenter: CHRISTOVA, Ekaterina (INRNE (Sofia))

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