ID de Contribution: **211**   Type: **Seminar**

The EMC effect within the light-front Hamiltonian dynamics for few-nucleon bound systems

jeudi 21 septembre 2023 11:50 (20 minutes)

We present the description of light-nuclei, in valence approximation, within a rigorous Light-Front (LF) approach. The latter, fulfills Poincaré covariance, macroscopic locality,number of particles and momentum sum rules. We applied the analysis to electron deep inelastic scattering (DIS) on ^{3}He, ^{3}H and ^{4}He targets, in the Bjorken limit. For details about the ^{3}He case, see Ref. [1]. Within the present framework, the main theoretical ingredient is the LF nuclear spectral function which can be related to the nuclear momentum distribution. The latter quantity has been calculated within the phenomenological Av18 + UIX potential and the chiral potentials called NVIa +3N and NVIb +3N. The evaluated momentum distribution has been used to calculate the structure functions of the considered nuclei. As discussed in Ref. [1], also for ^{3}H and ^{4}He, our analysis predicts a sizable European Muon Collaboration (EMC) effect [2]. Let us remark that, in the valence region, results are rather independent with respect to the use of different parametrizations of the nucleon DIS structure functions and the nuclear potentials. This investigation represents the first realistic calculations of the EMC effect, for different targets, which fulfills Poincaré covariance and thus preserving all the fundamental sum rules. Therefore, this a relevant study also in view of the present and future experimental scenarios.

REFERENCES

[1] E. Pace, M. Rinaldi, G. Salme', S. Scopetta, PLB 839 (2023) 137810

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Classification de Session: Plenary