

## Combined analysis of $K^-p$ reactions and $\pi\Sigma$ photoproduction data

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The measurements of  $\pi\Sigma$  mass distributions in the  $\gamma p \rightarrow K^+\pi\Sigma$  photoproduction reaction [1] probe the energy region of the  $\Lambda(1405)$  resonance, just below the  $\bar{K}N$  threshold, and provide new challenges for the theoretical models of  $\pi\Sigma - \bar{K}N$  coupled channels interactions. Adopting the photoproduction model presented in [2, 3] and the chirally motivated Prague model for  $\bar{K}N$  interactions [4] we performed a first time attempt on a combined fit of the  $K^-p$  low-energy data and the  $\pi\Sigma$  photoproduction mass spectra, without fixing the meson-baryon rescattering amplitudes [5]. The achieved description of the photoproduction mass distributions represents a significant improvement when compared with the parameter free predictions made in [3] but remains inferior to a more comprehensive model presented in [6] that employs much larger set of adjustable parameters, some of them purely phenomenological. Although our photoproduction model remains simple and is still lacking in some respects, in particular when predicting the mass spectra of the charged  $\pi\Sigma$  states, it still provides additional constraints on the positions of the  $\Lambda(1405)$  poles.

[1] K. Moriya et al. (CLAS Collaboration), Phys. Rev. C 88 (2013) 045201.

[2] P.C. Bruns, arXiv:2012.11298 [nucl-th].

[3] P.C. Bruns, A. Cieplý, M. Mai, Phys. Rev. D 106 (2022) 074017.

[4] P.C. Bruns, A. Cieplý, Nucl. Phys. A 1019 (2022) 122378.

[5] A. Cieplý, P.C. Bruns, arXiv:2305.06205 [nucl-th].

[6] S.X. Nakamura and D. Jido, PTEP 2014 (2014), 023D01; arXiv:1310.5768 [nucl-th].

### Parallel Session

Few-Body Systems

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