

Threshold Pion Photoproduction on Nucleons using Nuclear Model with Explicit Pions

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Introduction

In this nuclear model, the nucleons do not interact through a potential but emit and absorb mesons. In this project, we focused on the case where the mesons were pions and tested if we could replicate results from low-energy nuclear physics.

Objective

Test if the nuclear model can replicate a pion photoproduction process near the threshold and extract the parameters.

Approach

1. Construct the nuclear model and consider dressing of nucleon
2. Derive theoretical expressions for the cross-section
3. Fit to experimental data

Conclusion

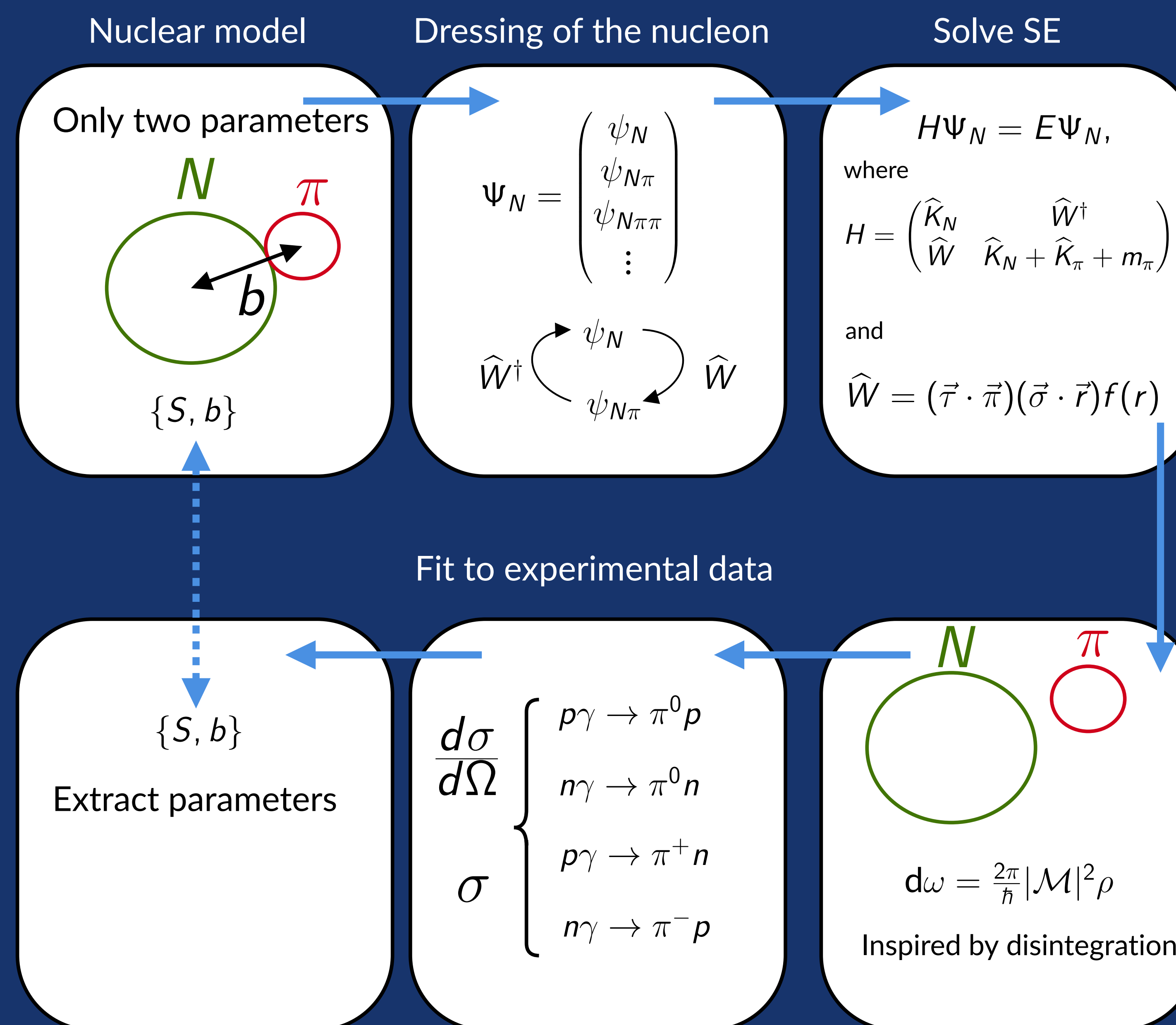
The nuclear model is able to describe photoproduction of neutral pions on the proton near the threshold.



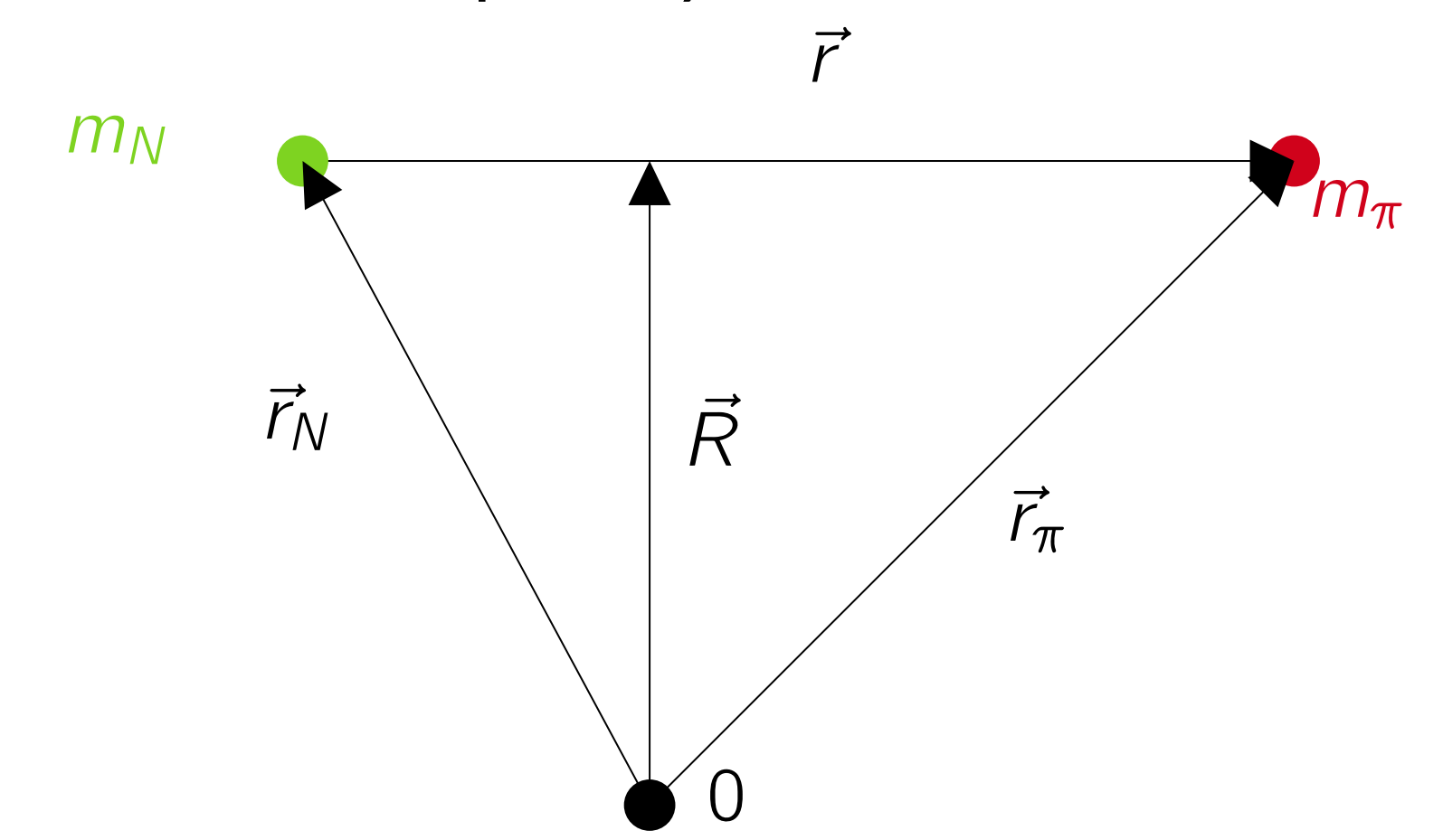
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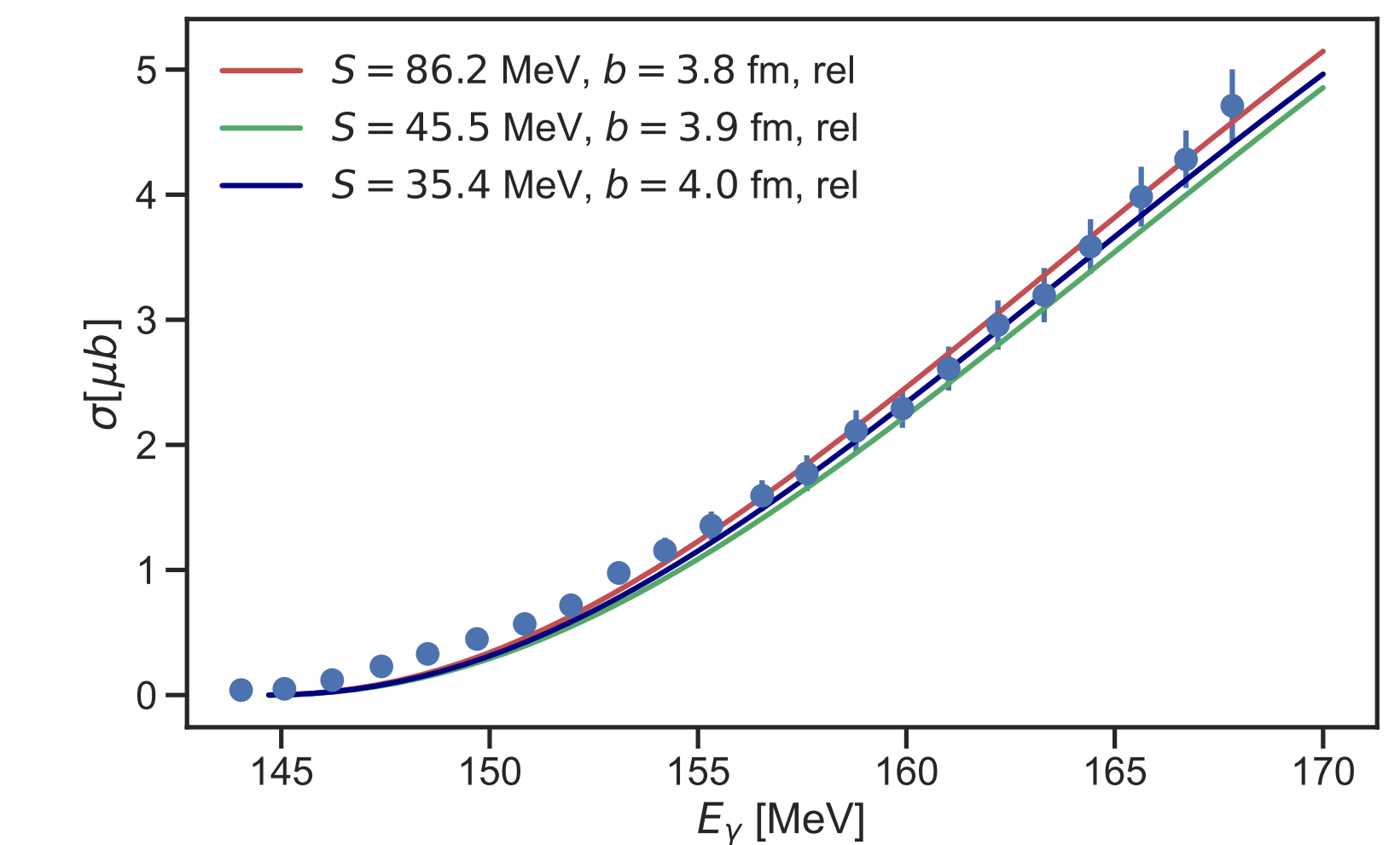
New nuclear model is able to reproduce phenomenon from low-energy nuclear physics.



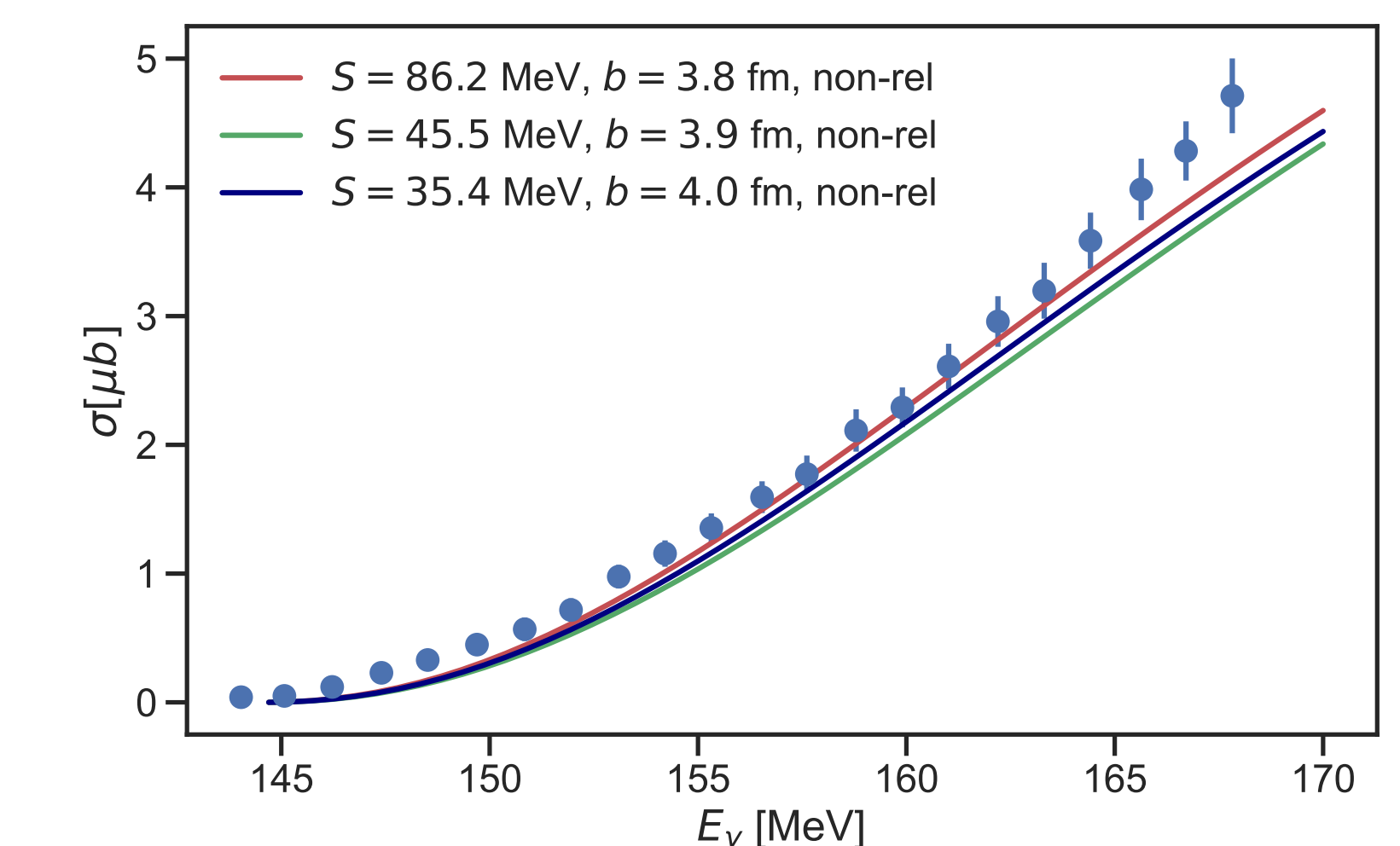
The nucleon-pion system



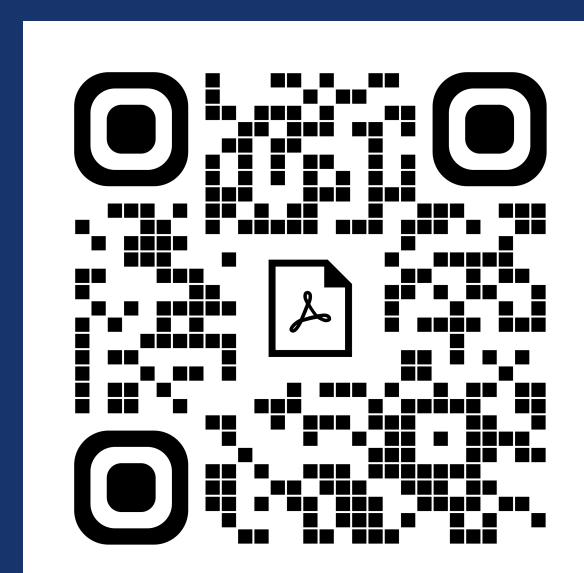
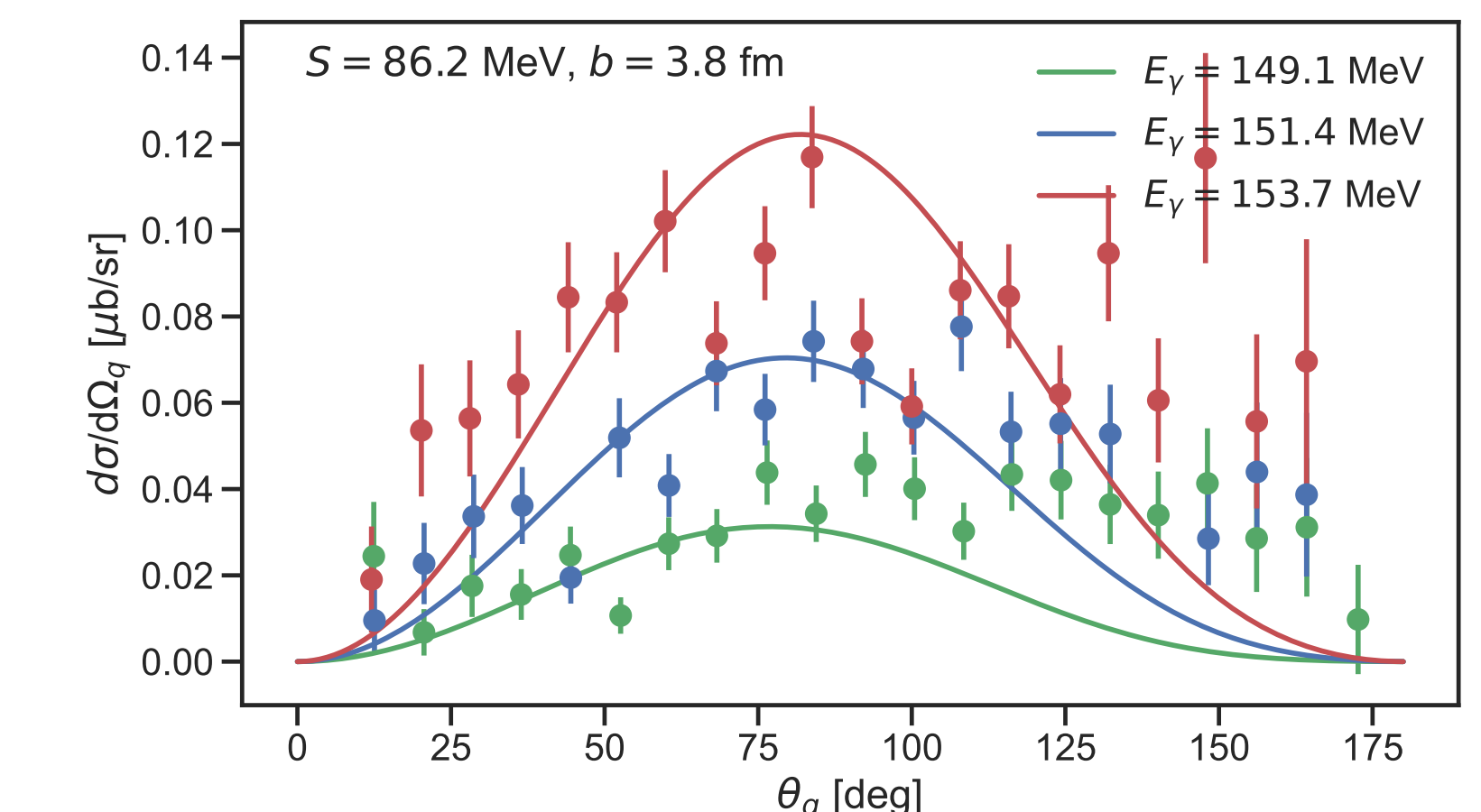
Cross-section using relativistic density of states



Cross-section using non-relativistic density of states



Differential cross-section



See full paper