Automation of calculations of angular distributions of differential cross sections of reactions

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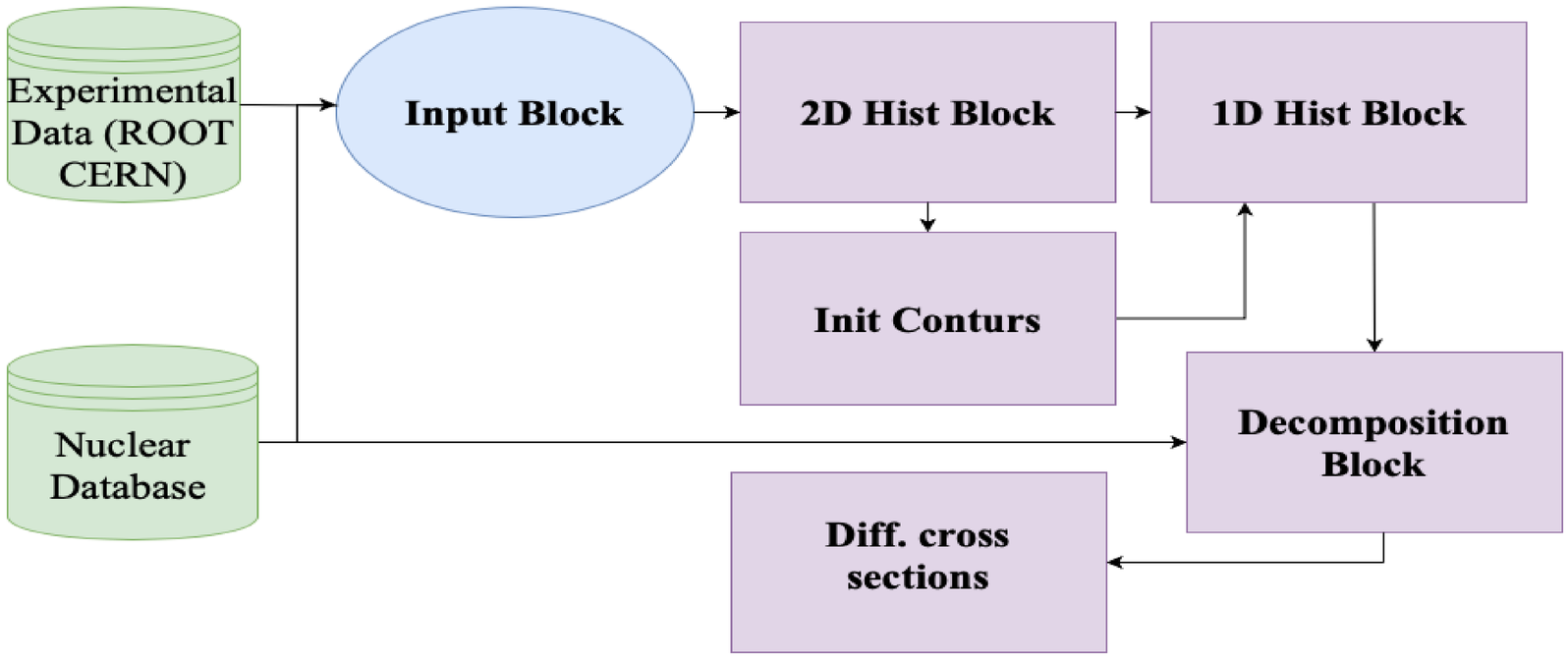
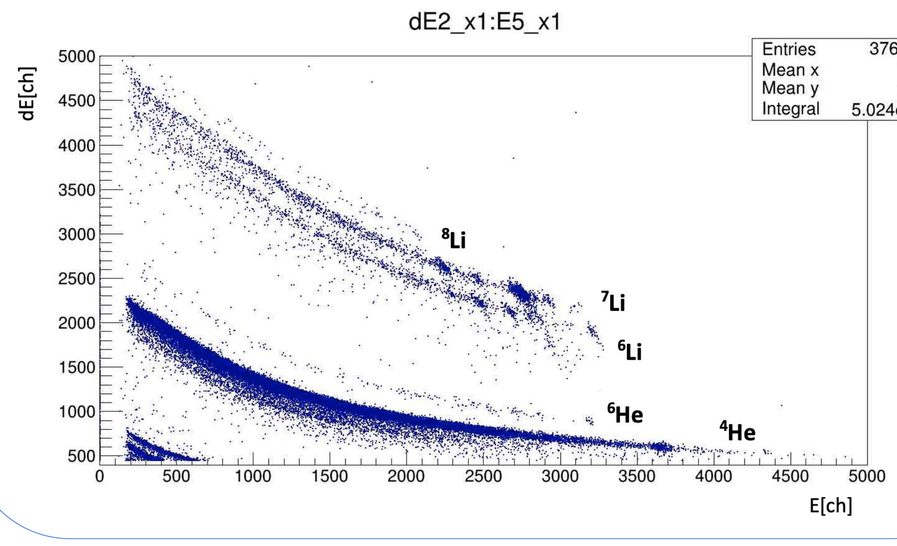
Introduction

In this paper, a set of programs is presented that allow obtaining angular distributions. For testing, the reaction $^{10}B(^{7}Li, ^{6}Li)^{11}B$ was used at an incident beam energy of 58 MeV. The experiment was done using the U-400 accelerator beam of the FLNR JINR, Dubna. One of the goals of the experiment was to study the excited states of the ^{11}B nucleus. The obtained differential cross sections are planned to be described using the Distorted Wave Born Approximation method (DWBA).



2D Hist Block



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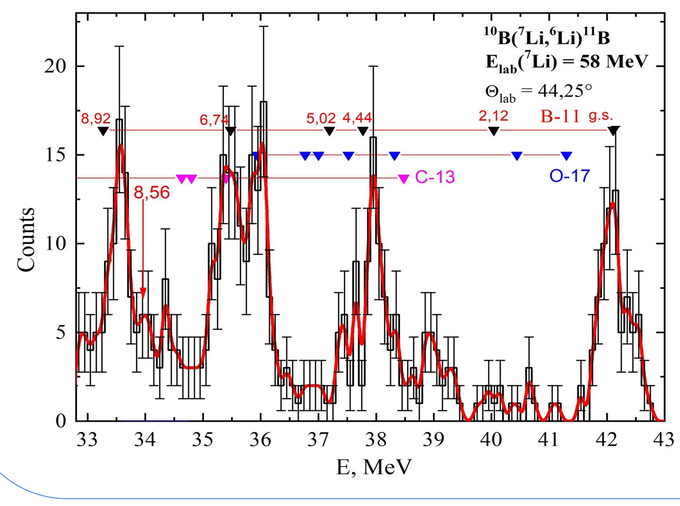
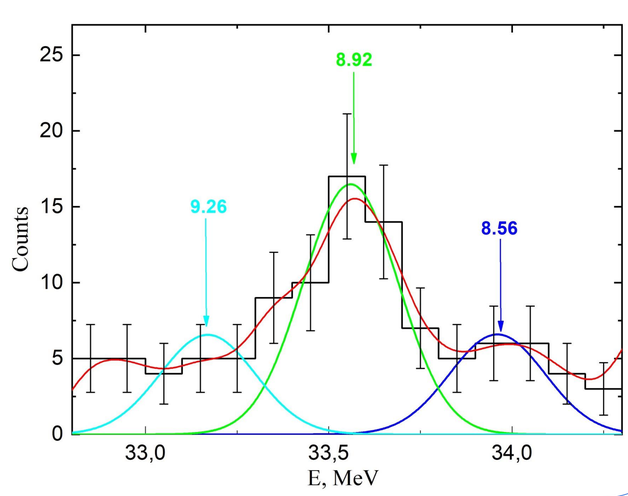
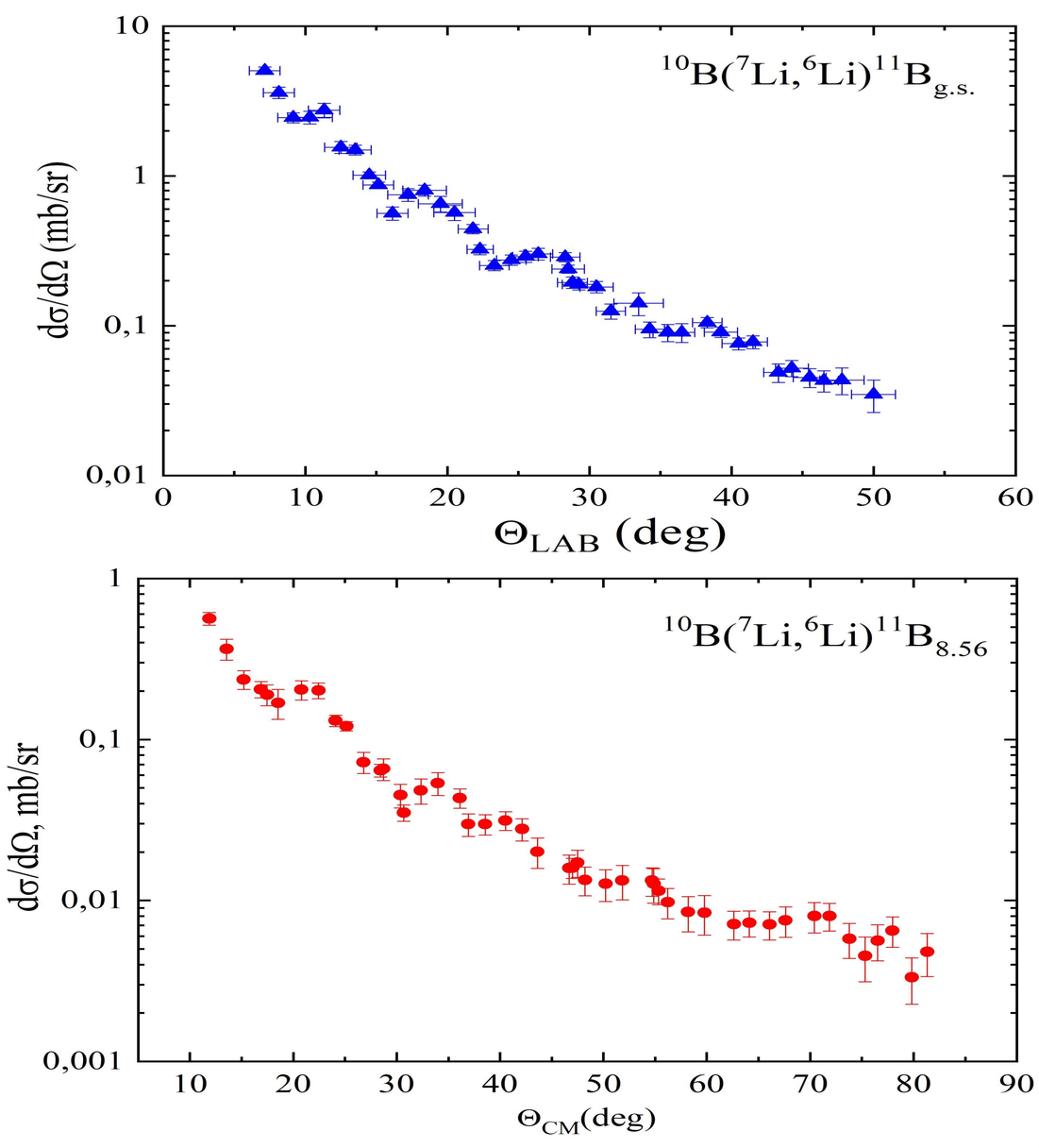




Differential cross sections



These figures show the differential cross sections for the ground state and 8.56 state of ^{11}B nuclei obtained using the calculation program. The calculation results are in good agreement with the manually calculated differential cross sections.

Conclusion

The calculation program has demonstrated its efficiency and accuracy in obtaining and calculating differential scattering cross sections. The program has flexible functionality, allowing the user to control the output results using proper recalibration.

The program also has a high speed of operation.