

Double-Target for Nuclear Medium Hadronization studies with CLAS12 at JLab

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In 2003, an experiment with a Double-Target (liquid deuterium and solid target simultaneously exposed to an electron beam) dedicated to better understanding the hadronization process in a nuclear medium was conducted in the CLAS spectrometer in Jefferson Lab's Hall B. To detect a wider variety of higher energy hadrons with higher luminosity at the upgraded CLAS12, a new experiment will be conducted using a new Double Target design. The new experiment is scheduled for 2024. The environmental conditions of the CLAS12 detector bring new engineering challenges that must be addressed. These challenges include temperature extremes, from low cryogenic to room temperatures, routine operation in strong magnetic fields, up to 5 T, significantly constrained space for a motorized exchange of different target types, high radiation, and high vacuum. Experiments and designs were made by a multidisciplinary group of engineers (informatics, electronics, design, and mechanics) and physicists that work at CCTVal to ensure the proper and reliable functioning of Double Target. A report summarizing these experiments' results was submitted to Jefferson Lab in 2022. The system is ready for commissioning in 2023.

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