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A compact Time Projection Chamber for the Crystal Ball

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The Crystal Ball Collaboration uses the energy tagged photonbeam facility in Mainz, Germany, to study photo-induced reactions on nucleons and nuclei.

The Crystal Ball/TAPS 4π calorimeter setup is optimized for the detection of neutral final states. Charged particles are identified and measured by the inner detector system including a two layer MWPC. The increased rate of charged particles in current and future experiments exceeds the rate capability of these MWPCs.

We are developing a small Time Projection Chamber with triple GEM readout meeting the stringent space requirements of the Crystal Ball experiment. This new tracking detector will feature higher rate capabilities and allows better track reconstruction.

We are investigating the use of Carbon Fiber Reinforced Plastics (CFRP) to build light but strong chamber walls.

First tests with carbon fiber prepregs show promising results.

In addition we are using the PLUTO event generator to study the detector acceptance under our experiment conditions. Similar simulations are done to optimize the number and the shape of the readout pads.

This poster will give an overview of the current status of the project and present the latest results.

Collaboration

A2 Collaboration

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