

Experimental Safety Assessment Document (ESAD)
for Hall A Experiments PREX (E12-11-101) and
C-REX (E12-12-004)
(draft) May 10, 2017

The Experiments “PREX” and “C-REX” are scheduled to run back-to-back in XXX. The experiments use the Hall A base equipment, as well as specialized equipment for parity experiments. Specifically, the experiment will use the following items.

Older, Established Equipment

- The standard Hall A beamline, as described in the Hall A Operations Manual
- The two High-Resolution Spectrometers (HRS) as described in the Hall A Operations Manual
- The Standard HRS detector packages, also described in the Hall A Operations Manual. The lead glass should be removed prior to the experiment because of the high flux of scattered electrons. The VDCs are to be operated only at currents below $1 \mu\text{A}$.
- The Hall A luminosity monitor, installed on the beamline after the target. This detector has been frequently used since installation in 2004. No TOSP is required.
- The Hall A Compton Polarimeter. A specialized crew will maintain the polarimeter, but shift workers will be expected to start and stop runs. This device has an Operations Safety Procedure document (OSP) and a separate Operations Manual.
- The Hall A Møller Polarimeter. A specialized crew will take data periodically. This has an OSP and an Operations Manual.

New Equipment

- The cryogenically-cooled Lead/Diamond targets and ^{48}Ca target. Trained target operators (TO) are required for each shift. The TO is trained on safety-related issues. The TO needs to watch the temperature on the return line. If this ever rises above 50K, the TO should request beam off to avoid melting the target, and call the Run Coordinator (RC). The only possible adjustment is on the JT valve, which normally does not need any adjustment. Experience shows that the lead targets melt after typically one week of operation; if this happens, the TO should stop beam and call the RC. To judge if the target has melted, the TO should run “spot” to observe the profile. An OSP will be required. An Operations Manual will be written.
- The Septum Magnets, located between the target and the HRS, have an OSP and an Operations Manual. This was the same septum magnet used during PREX-I, except that it will run in a 3-coil configuration. The best source of pictures of these items at the moment is in the Design Document, <http://hallaweb.jlab.org/parity/prex/PrexCrexDesign.pdf>.
- A copper-tungsten collimator is located about 1 meter downstream of the target. After beam operations start, the collimator will be under strict control of the RadCon group. An OSP will be required. See the Design Document, <http://hallaweb.jlab.org/parity/prex/PrexCrexDesign.pdf>.
- Supplemental shielding will be provided in the region around the target, the copper-tungsten collimator, and the septum. The collimator and beamline elements nearby will be significant sources of radiation. The area around the target will be roped off and inaccessible without approval by the RadCon group. An OSP will be required. See the Design Document, <http://hallaweb.jlab.org/parity/prex/PrexCrexDesign.pdf>.
- In each HRS, a Quartz Cerenkov Detector will be installed to integrate scattered electrons in each helicity period. An OSP will be written. The instructions for operation will be provided in the counting room. The detectors are shown in fig 1 and 2.

- GEM Detectors will be deployed in the focal plane. These are tracking detectors being developed by the University of Virginia. These will operate under the same OSP as the Quartz detector, as it is part of a package of new detectors. The instructions for operation will be provided in the counting room. See fig 1 and 2.

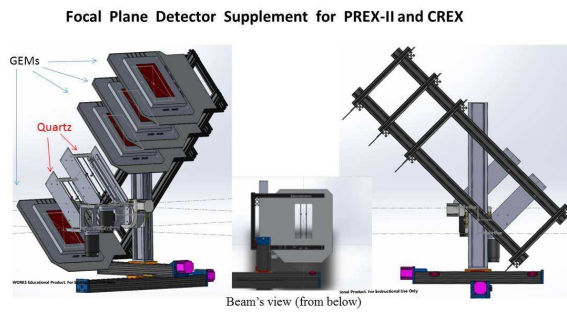


fig 1

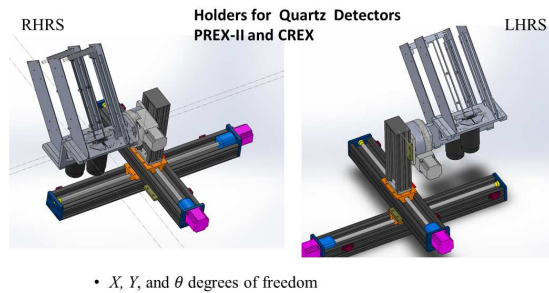


fig 2