

Hall A Target Configuration/Operation

For March 2007

David Meekins

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Target Positions

The following table gives a list of target positions and materials.

Target	Material	BDS Position
Solid 1	BeO	10496363
Solid 2	Carbon	8545643
Solid 3	Pb diamond	6594922
Solid 4	Pb diamond	4644203
Solid 5	Bi diamond	2693483
Empty	n/a	0

Solid target ladder

The following table gives the target foil position, thicknesses and chemical purities.

Target Position	Target	Purity	Thickness g/cm ²
Solid 1	BeO	99.00%	0.149 ± 0.001
Solid 2	C	99.95%	0.0838 ± 0.0001
Solid 3	Pb+C	see	below
Solid 4	Pb+C	see	below
Solid 5	Bi+C	see	below

Error in thickness is from measurement of area and mass only. Error does not include possible voids in materials. For details about the last three solid targets, see attached document by A. Saha. The following table gives the last three solid target stack details.

Target Position	Upstream Foil	Middle Foil	Downstream Foil
Solid 3	Diamond 1	Lead 4	Diamond 2
Solid 4	Diamond 3	Lead 5	Diamond 4
Solid 5	Diamond 5	Bi 1	Diamond 6

The document by A Saha is attached at the end of this document.

Operation

The solid target ladder is cooled from the loop 2 heat exchanger. The Loop 2 JT valve is the only valve which must be operated during this running period. The most important quantity to monitor is the 15K return temperature. This temperature should be kept below 30K at all times. (Note that it will take about 24 hr for the return transfer line to come to equilibrium after a cool down; during this period, the return line should be kept below 35K.) Adjust the loop 2 JT to do so. There should not need to be very much adjustment of this valve position. We must also maintain a flow rate of less than 10 g/s because Hall C is also using the 15K refrigerator. I would suggest a flow rate of about 6-7 g/s to maintain the return line temperature. For high current running, on lead for example, the valve may have to be adjusted higher. If a gas panel pressure alarm sounds, silence the alarm and page Dave Meekins @ 584-5434. This is not as crucial an alarm because there is no hydrogen in the system.

Pictures

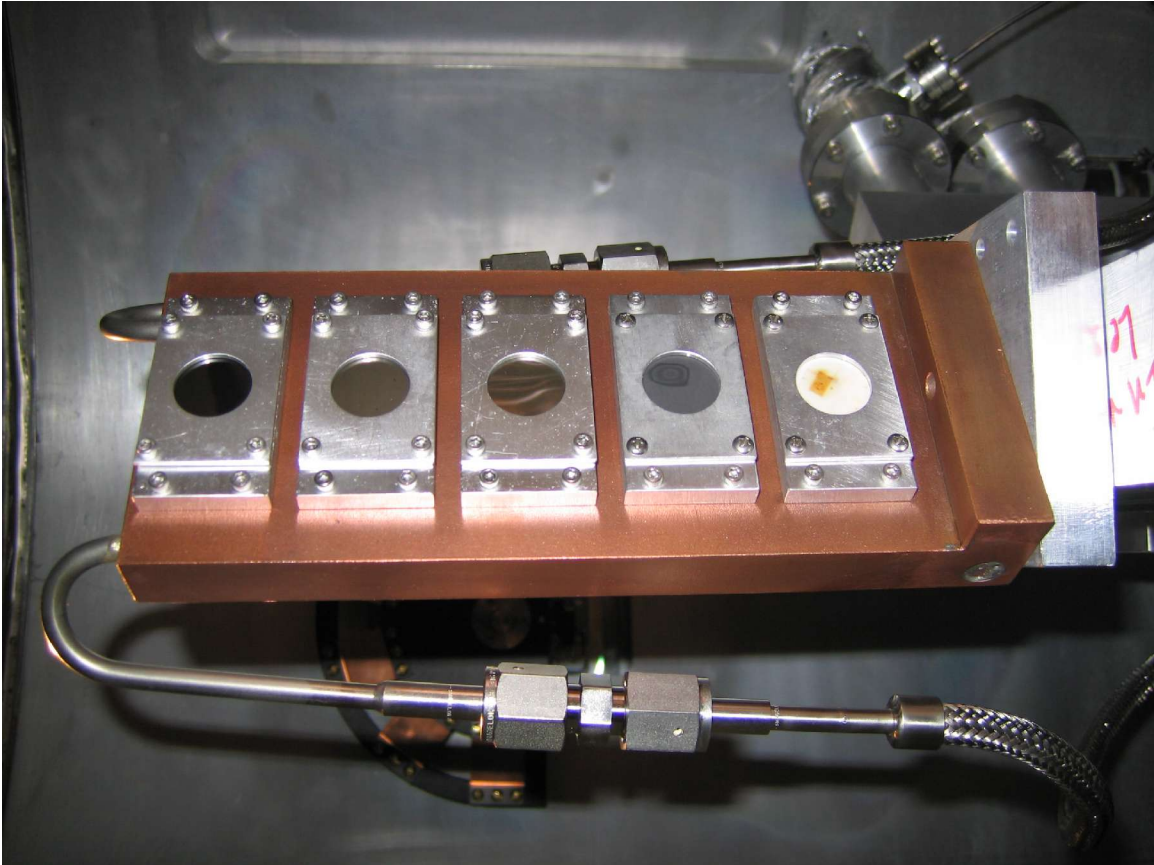


Illustration 1 Downstream view of ladder

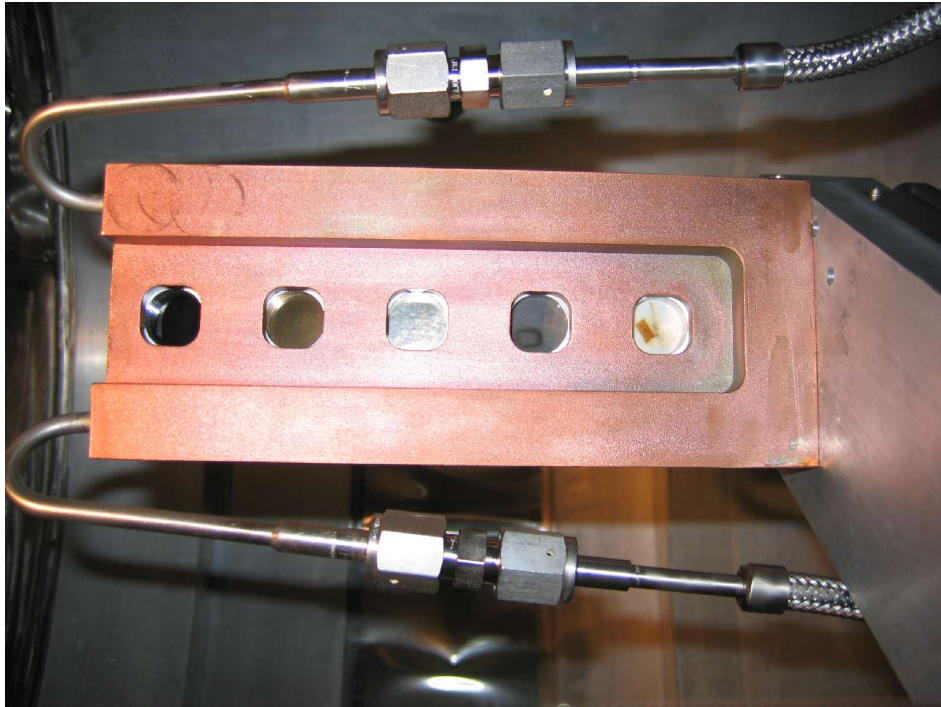


Illustration 2 Upstream view of ladder

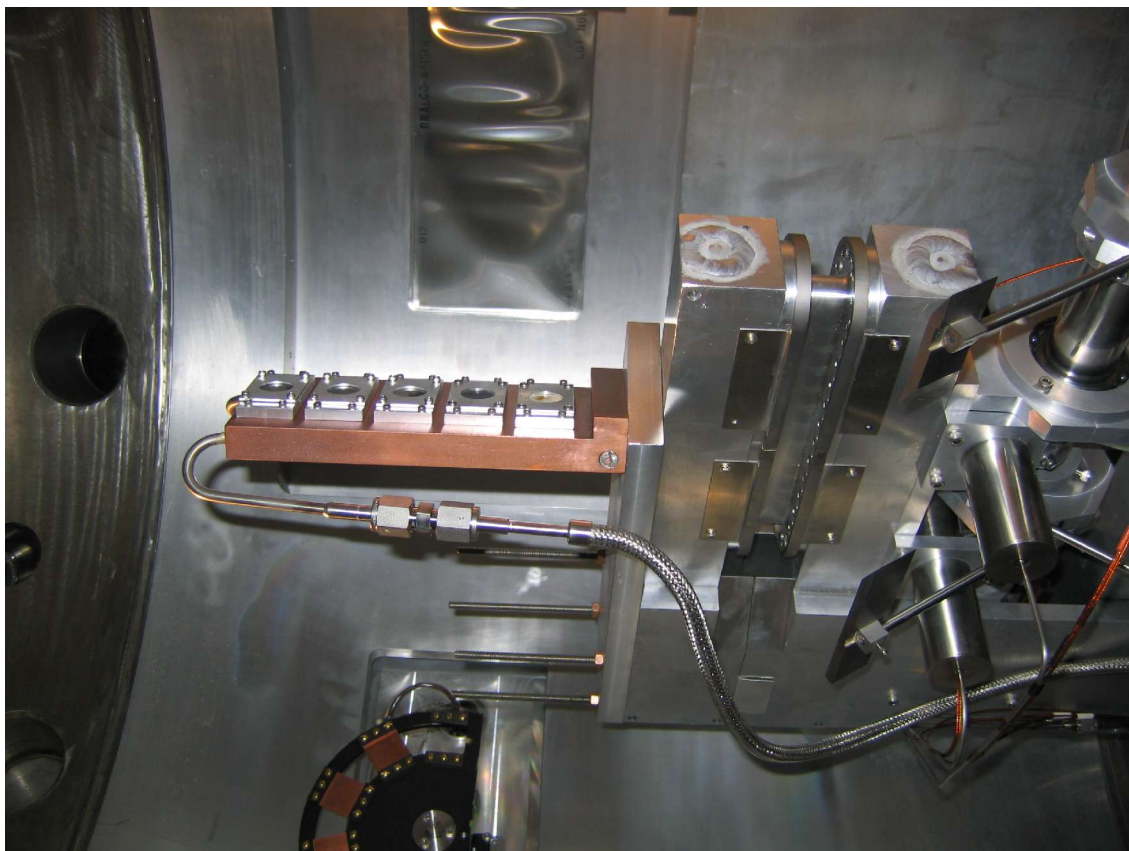


Illustration 3 Side view of ladder

By A. Saha

E06-007: $^{208}\text{Pb}(e,e'p)$ Experiment

Target Information

^{208}Pb Isotopic Pure Lead Targets

3 Foils (99.09% pure), Density = 11.35 gm/cm³

Dimensions: 0.95 inches x 0.95 inches x 0.17 mm thick

Measured thicknesses by weight (mg(mm)): Foil #4: 1134 (0.172), #5: 1128(0.171) , #6: 1120(0.169),
Foils #1,2,3, are 0.5 mm thick for the Parity experiment

Vendor: Oak Ridge National Lab (Order No. 59-0250, Batch No. 162446)

Contact: R.L. Cline, Manager Isotope Business Office (Phone: 865-574-6984)

Lee Zevenbergen, Technician (Phone: 865-574-5917)

P.O. Box 2008 Oak Ridge, TN 37831-6158

^{209}Bi Isotopic Pure Bismuth Target

4 Foils (99.999 % pure) rolled, unsupported, Density = 9.8 gm/cm³

Dimensions: 25 mm x 25 mm x 0.20 mm

Measured thickness by weight (mm): Foil #1: 0.210, #2: 0.207, #3: 0.209, #4: 221.

Vendor: Goodfellow Corporation

Contact: Elaine Matt, Herb

237 Lancaster Avenue, Suite 252, Devon, PA 19333-1594

Phone: 1-800-821-2870

Diamond Foils

10 Foils, Free standing CVD diamond foils, polished both sides, Density = 3.515 gm/cm³

Thermal conductivity: > 1000W/M K

Dimensions: 1" x 1" x 0.15 mm thick

Measured thickness from vendor by weight (mm) : #1: .133-.153, #2: .138-.160, #3: .130-.157, #4: .123 - .141,
#5: .123 - .138, #6: .135-.160, #7: , #8: , #9: , #10: .

Our Measurements (wt. in g, dimensions in “)

#1 - 0.3075g(0.999" x 0.999"), #2 - 0.2962g(0.998" x 0.996"), #3 - 0.2989g(0.998" x 0.999"),

#4 - 0.2541g(0.999" x 0.999"), #5 - 0.2704g(0.998" x 1.0"), #6 - 0.3366g(0.998" x 1.001"),

#7 - 0.3740g(0.998" x 1.001"), #8 - 0.3542g(0.998" x 1.0"), #9 - 0.3122g(0.996" x 0.998"),

10 - 0.3336g(0.996" x 1.0")

Vendor: Coating Technology Solutions (CTS) Inc.

Contact: Roy Gatt, Plasma and Process Products

36-B Munroe Street, Sommerville, MA 02143

Phone: (617) 625-2725

Carbon Foils

1 Graphite foil: $83.8 (+/-0.5) \text{ mgm/cm}^2 = 0.37 \text{ mm}$ (used in many experiments), Density = 1.8 gm/cm^3
http://www.jlab.org/~meekins/Target_Configs/HallA/Nov_2006/halla_config_11_27_06.htm

We also have 10 Foils (99.95% pure) rigid graphite with fine grain size.

Dimensions: 25 mm x 25 mm x 0.15mm (thick)

Measured thickness by weight(mm): Foil #1:0.116 , #2: 0.116, #3: 0.119, #4: 0.118, #5: 0.118, #6: 0.116, #7: 0.119, #8: 0.119, #9: 0.116, #10: 0.117.

Vendor: Goodfellow Corporation

Contact: Elaine Matt, Herb (1-800-821-2870) - same as Bismuth target.