

PREX Target Ladder

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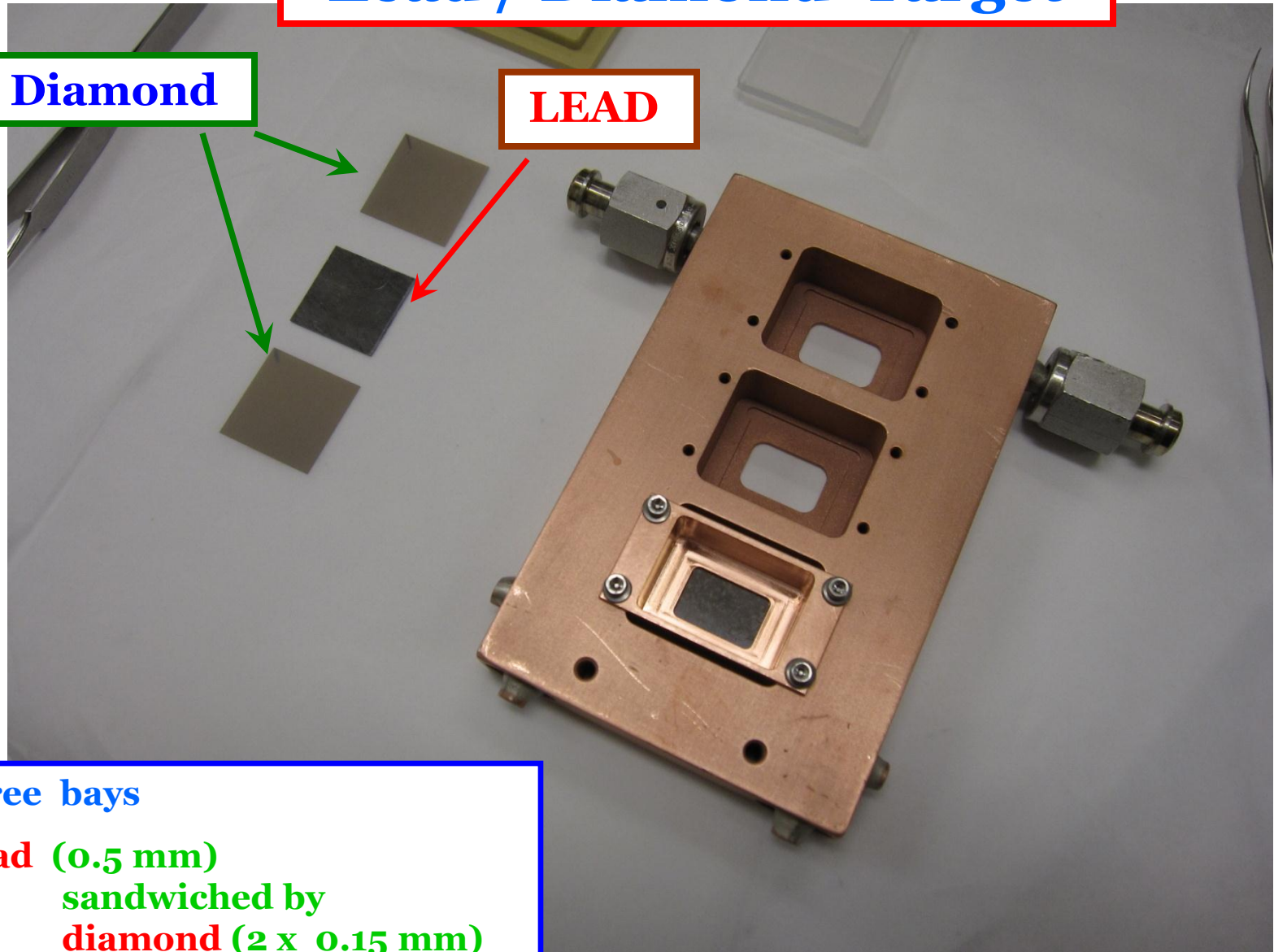
PREX/CREX Meeting

Dec 2014

Lead / Diamond Target

Diamond

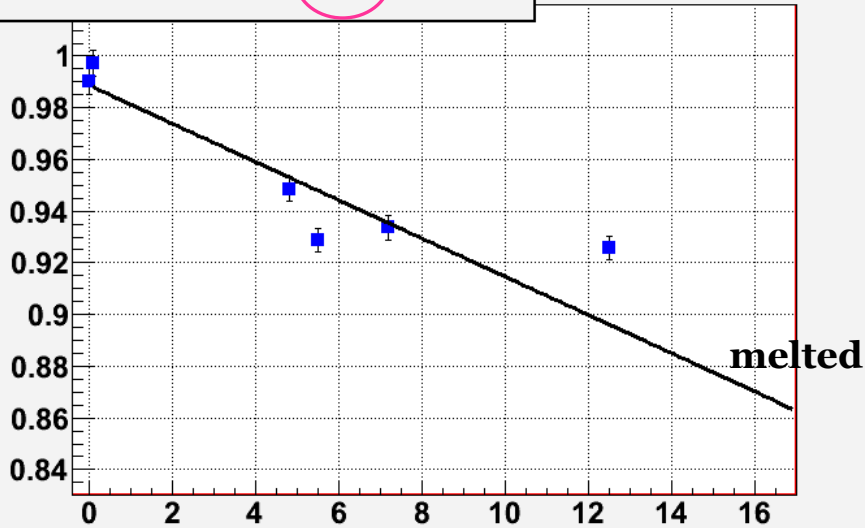
LEAD



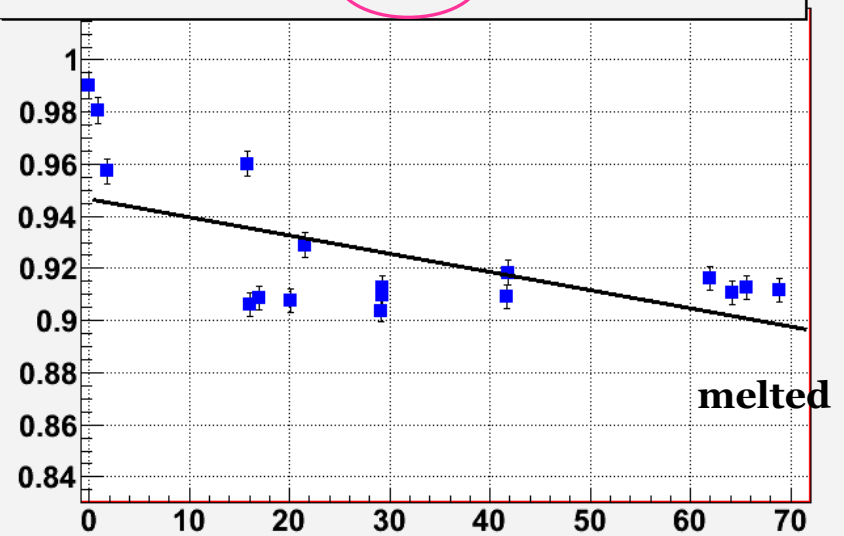
- Three bays
- **Lead** (0.5 mm)
sandwiched by
diamond (2 x 0.15 mm)
- Liquid He cooling (30 Watts)

PREX-I Performance of Lead / Diamond Targets

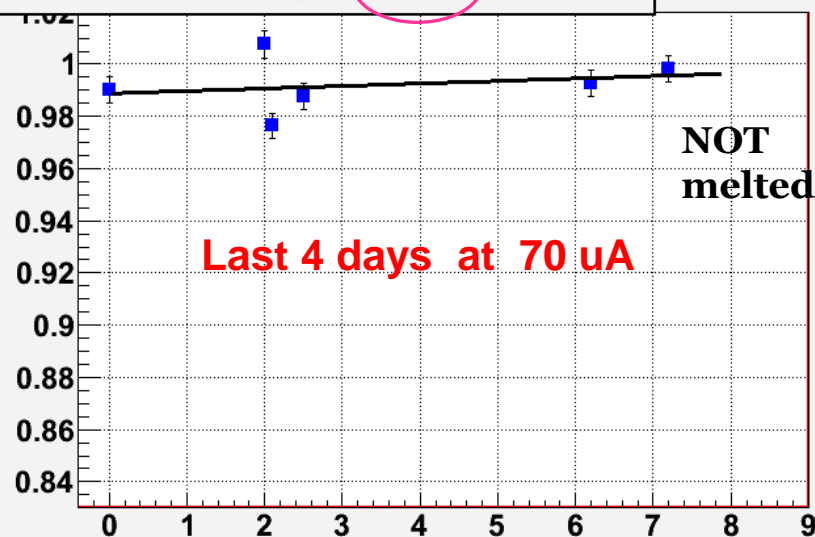
Rate vs Time (days) **THIN** Diamond



Rate vs Time (days) **MEDIUM**-thickness Diamond



Rate vs Time (days) **THICK** Diamond



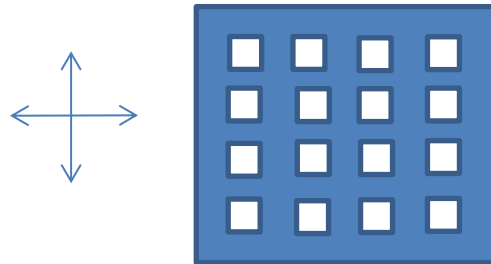
Targets with thin diamond backing (4.5 % background) degraded fastest.

Thick diamond (8%) ran well and did not melt at 70 uA.

→ Solution: Run with 10 targets.

Status and Plans: PREX Target

- 10 foils isotopically pure ^{208}Pb are purchased and in-house
- Diamond not yet purchased, several vendors found
polycrystalline diamond
purchase strategy: buy 1/3 foils from the known vendor,
2/3 foils from new, cheaper vendor
- **running strategy:**
 - commission with chemically pure lead
 - switch to isotopically pure lead for production
 - 10 targets x 7 day lifetime = 70 days running
- **Target frame -- we are leaning towards reusing the Qweak XY scanner with room for ~15 Pb targets.**



rough sketch -- see Silviu's talk for accurate drawing

Strawman PREX Target List

Production Targets

Lead	Backing	Quantity
isotopically pure	diamond	9
isotopically pure	graphite	1
chemically pure	diamond	2
chemically pure	graphite	3

Notes

- We only have 10 isotopically pure Pb foils
- Graphite is worth trying. (limited to 40 uA but more robust)

Angle Measurement

Water, or other

See Nikki's talk

Auxiliary Targets

Target	Thickness(es)
BeO viewer	100 mg/cm ²
¹⁸¹ Ta	100 mg/cm ²
¹² C	20, 50, & 500 mg/cm ²
Thin lead	60 mg/cm ²
Holey ¹² C	100 mg/cm ²
¹² C Optics	Std. multi-foil target
⁴⁰ Ca	100 & 1000 mg/cm ²