Drift Chamber R&D

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1. Plating the endplate: Alodine or electroless nickel?
2. Deflection of 1/32 segments of the endplates.
3. Prototype III, a 1/16 segment of the chamber.

Plating Studies

Good electrical contact of the Al endplates is needed at the edges (RF shielding) and in the field-wire holes on the rear endplate.

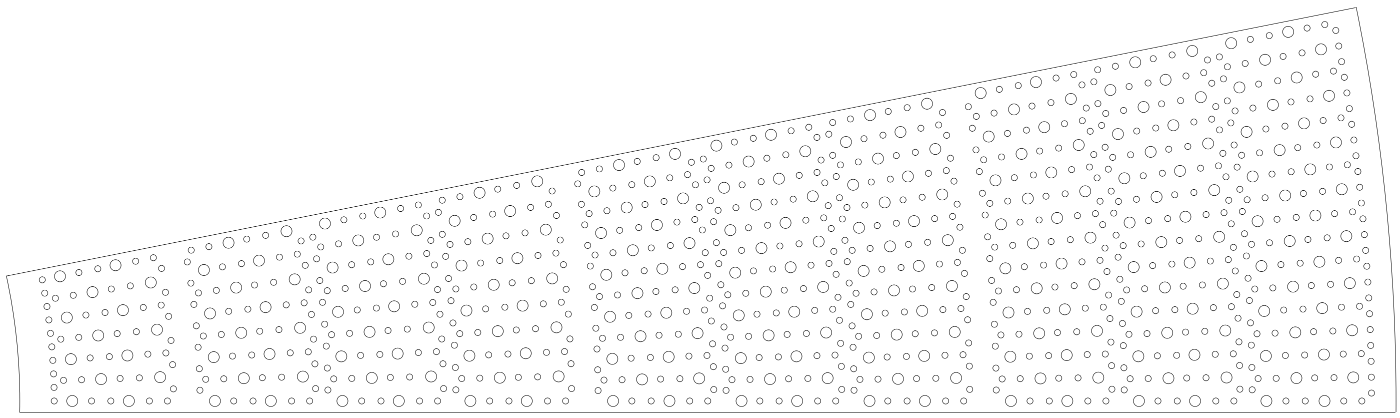
The Alodine process stabilizes the aluminum-oxide surface with a thin overcoat of chromium oxide.
$\Rightarrow$ Surface resistance equal to or greater than with aluminum oxide.
Inexpensive.

The electroless nickel process can put a layer of nickel up to $0.0001''$ thick.
Good coating of walls of holes.
Harder surface may be better for seating of metallic feedthroughs.

Sample Al blocks $1'' \times 1'' \times 6''$ with 10 $1/8''$-diameter through holes will be sent to candidate plating vendors.

Study of 1/32 Sectors of the Endplates

Drill a 1/32 sector of a 24-mm-thick endplate and of a 24/12-mm-thick stepped endplate.



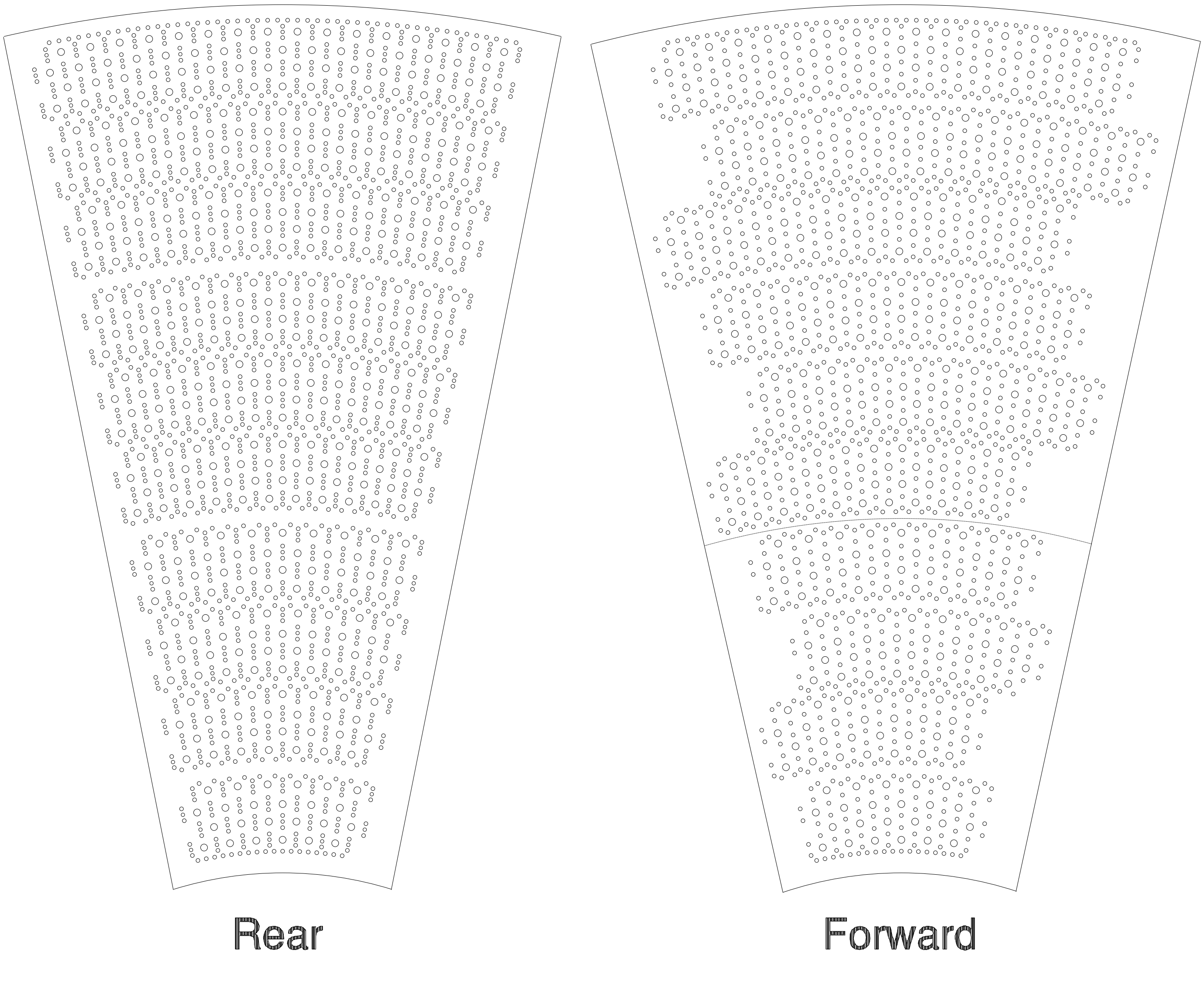
Drilling done at Princeton on CNC mill with Guhring GT100 series parabolic drills.

Evaluate drilling accuracy with our Brown & Sharpe coordinate measuring machine.

Measure deflections before and after drilling with simulated wire loads to verify stress analyses.

Prototype III, a 1/16 Sector Chamber

The electronics for the final chamber is organized into 1/16 sectors. Prototypes I and II do not have this pattern.



$7104/16 = 444$ cells.

Prototype III would be a test facility for the front-end (and trigger) electronics as mounted on the final chamber.

The endplates could be the test plates fabricated by the endplate drilling vendor.

The chamber could be short, say only 30 cm (1/9 full length), to facilitate construction and possible transport to a test beam.

A short chamber could be inserted in a C- or H-magnet for trigger studies.

The chamber could use feedthroughs and crimp pins from the initial production run for the final chamber, following any modifications from Prototype II experience.

The chamber would use final high-voltage service boards, and prototype front-end electronics in 'final' boxes.

Mounting, cabling and cooling of the electronics would utilize the final design.

Front-End Electronics for Prototype III

The baseline front-end electronics uses two ASICs still under development.

Quantites of several hundred channels may not be available in time for use on Prototype III ($\approx$ Jan '97).

Option to design and fabricate prototype quantities of front-end electronics using existing commercial components, plus the DIRC TDC chip, in hybrid packaging that would occupy the same volume on the endplate as the baseline electronics.