

Design of a Target Vacuum Can

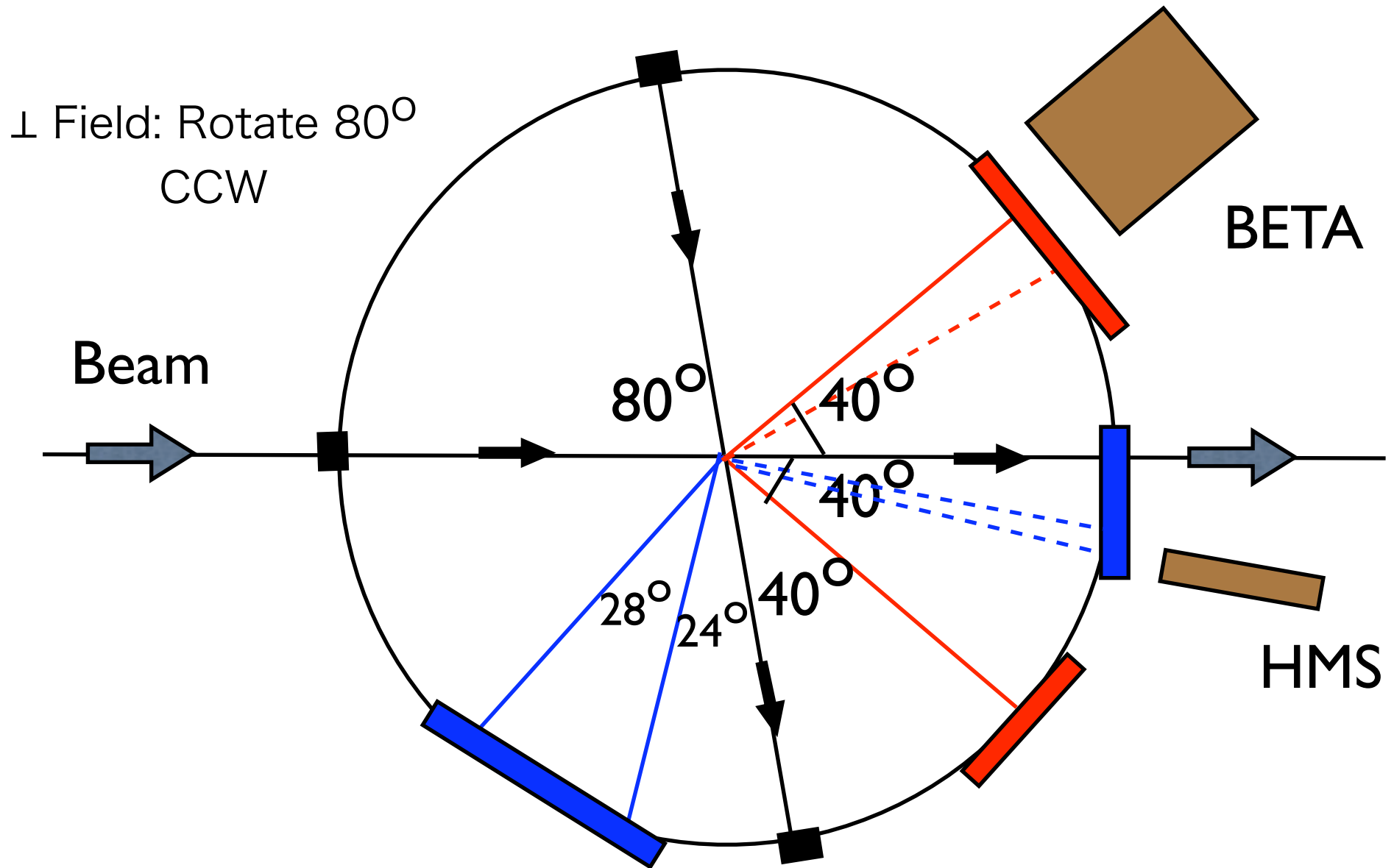
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- A new can needs to be designed so that a tracking detector is close to the target (~40cm?).
- Need to determine window locations and dimensions (ray-tracing of particles are necessary.)
- Will be used for SANE and Semi-SANE

SANE Kinematics (as of Nov '04)

Beam Energy (GeV)	BETA energy (GeV)	BETA Angle (deg)	P_{HMS} (GeV/c)	HMS angle (deg)	Target Field	Run type
4.8	0.8-1.9	40	--	--	// \perp	Production
6.0	1.0-2.2	40	--	--	// \perp	Production
6.0	--	--	1.0-1.7	24-52	//	e^+ BG
3.6-4.8	1.9-2.2	40	2.5-3.4	24-30	Field off, magnet \perp	Calibration (ep elastic)
6.0	0.75-2.0	30	2.7	10.8	//	Semi-SANE

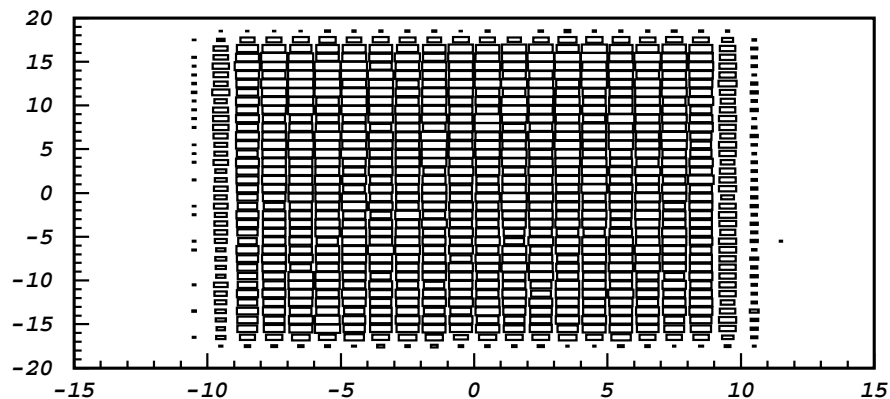
Target Window Openings (Top view)



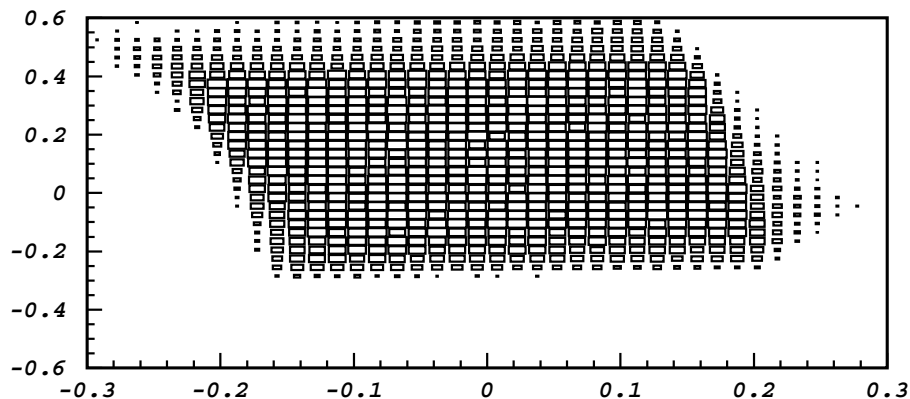
Particle Distribution at the window (BETA)

- Assume the window is at $R=50\text{cm}$
- Momentum range: $0.7\text{--}2.5(\text{GeV}/c)$

Parallel Field

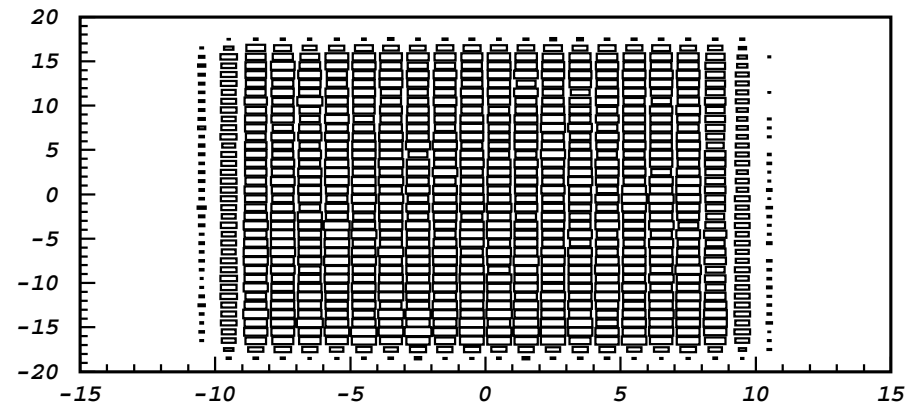


$X1$ vs $Y1$

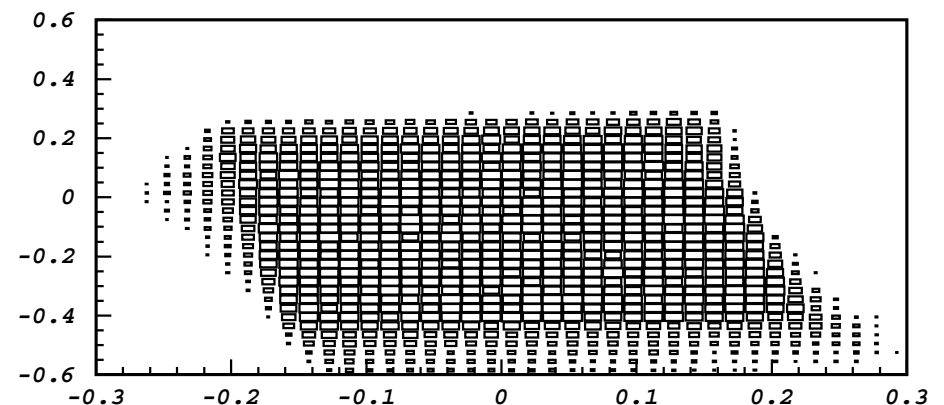


DX vs DY

Perpendicular field



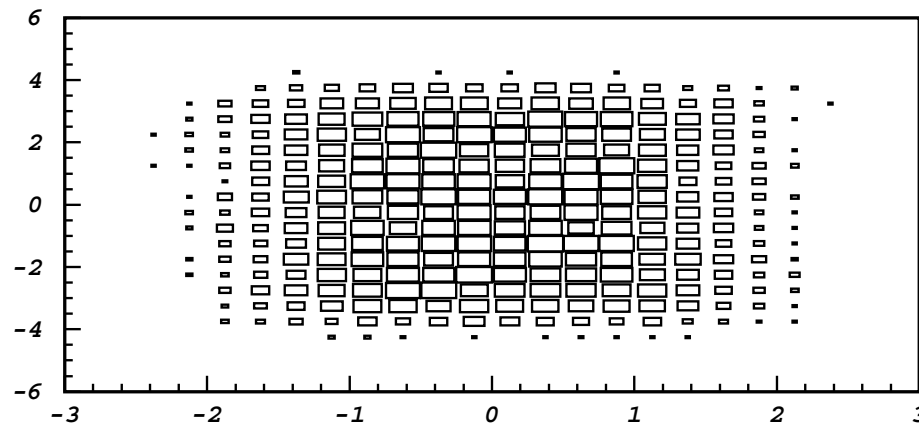
$X1$ vs $Y1$



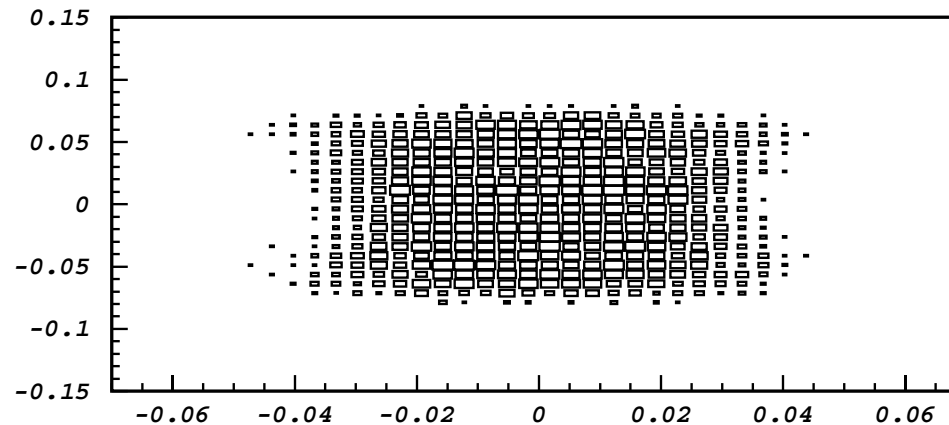
DX vs DY

Particle Distribution at the window (HMS)

- Assume the window is at $R=50\text{cm}$
- $P_{\text{HMS}}: 1.0\text{--}2.0(\text{GeV}/c)$, HMS at 24°
- Detect +/- charge particles



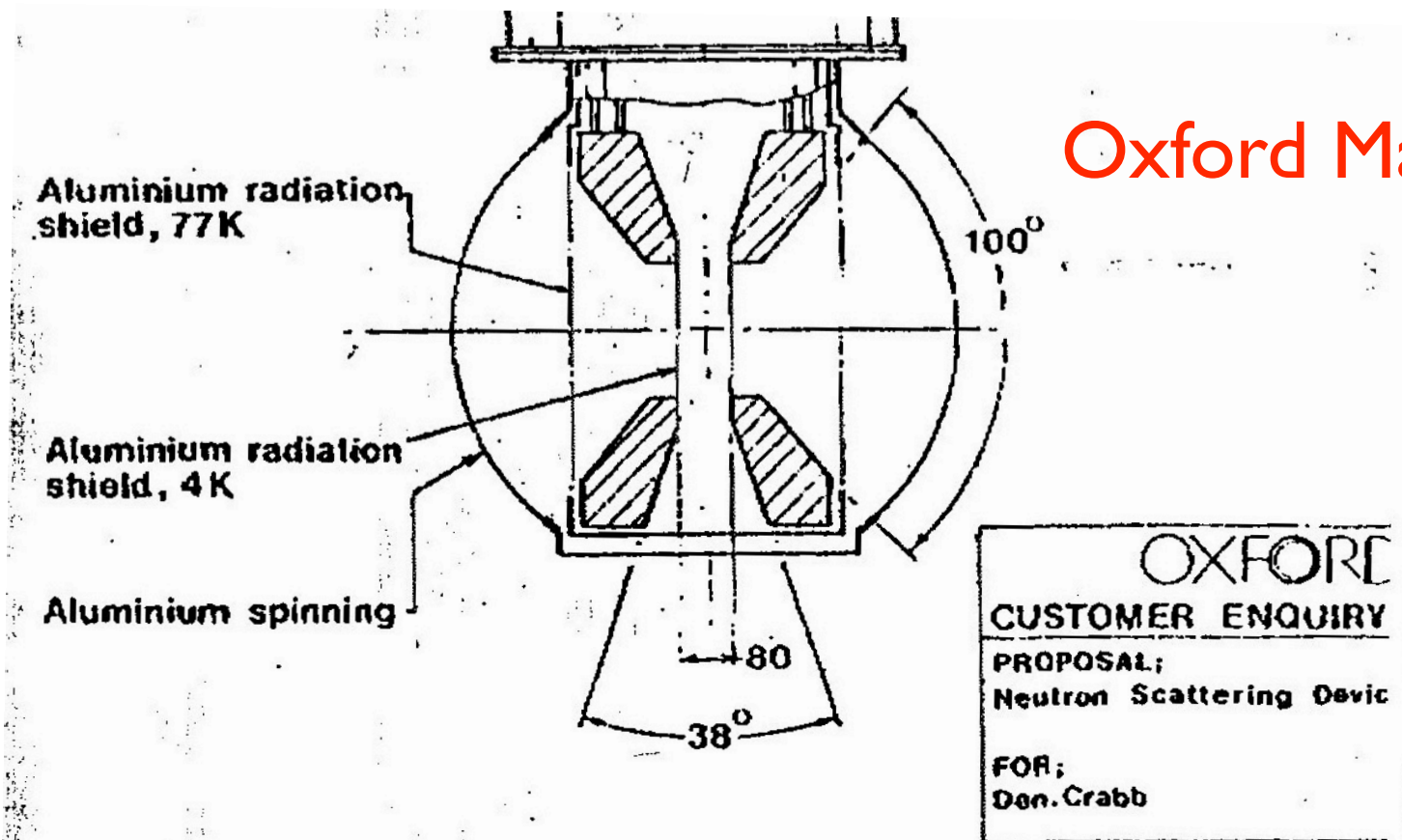
$X1$ vs $Y1$



DX vs DY

Possible Shapes of Target Can

- **Cylindrical can** (Tracking detector is inside the can)-- Difficult to rotate the magnet
- **Can with re-entrant cones** (the exit windows will be small)



Oxford Magnets

UVa OVC for Gen and RSS (2001,2002)

