



Power Loads and Divertor Design

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Overview

- Objective: Feasible Divertor Design considering heat loads, temperature distribution and physical extent.
- Tools: GOURDON/GEOM codes
- Time Table: Now!



Methodology

- Particles from plasma Following Field lines
- Assume Power leaves LCMS uniformly

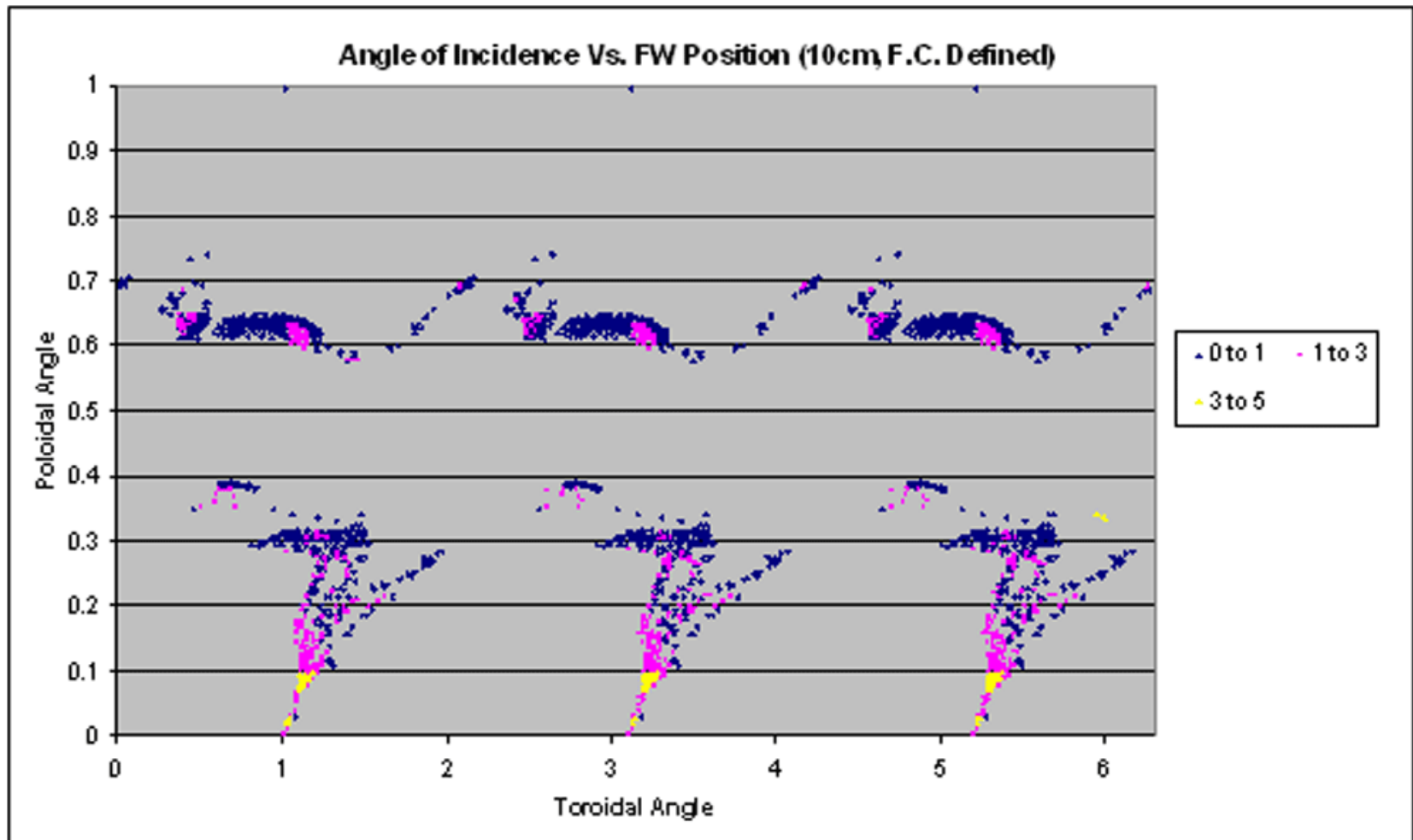
$$\longrightarrow P_i = P_{Therm} / N$$

- Field lines started with in 1cm of LCMS
- Angle of Incidence, Line length, Densities

$$\longrightarrow W_i = \sum P_j \sin(\psi) / A_j$$

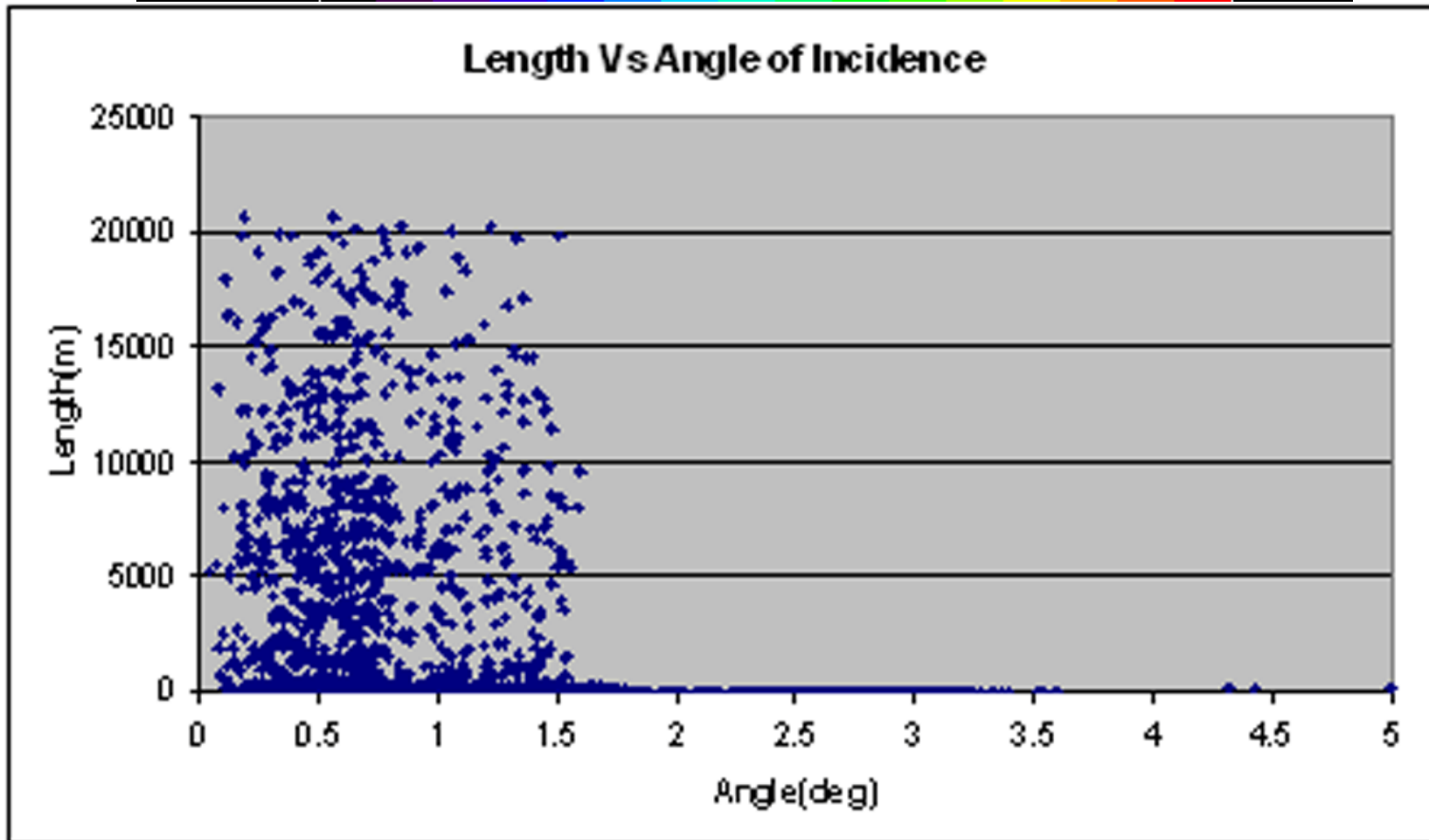


Case1:Wall conformal to LCMS



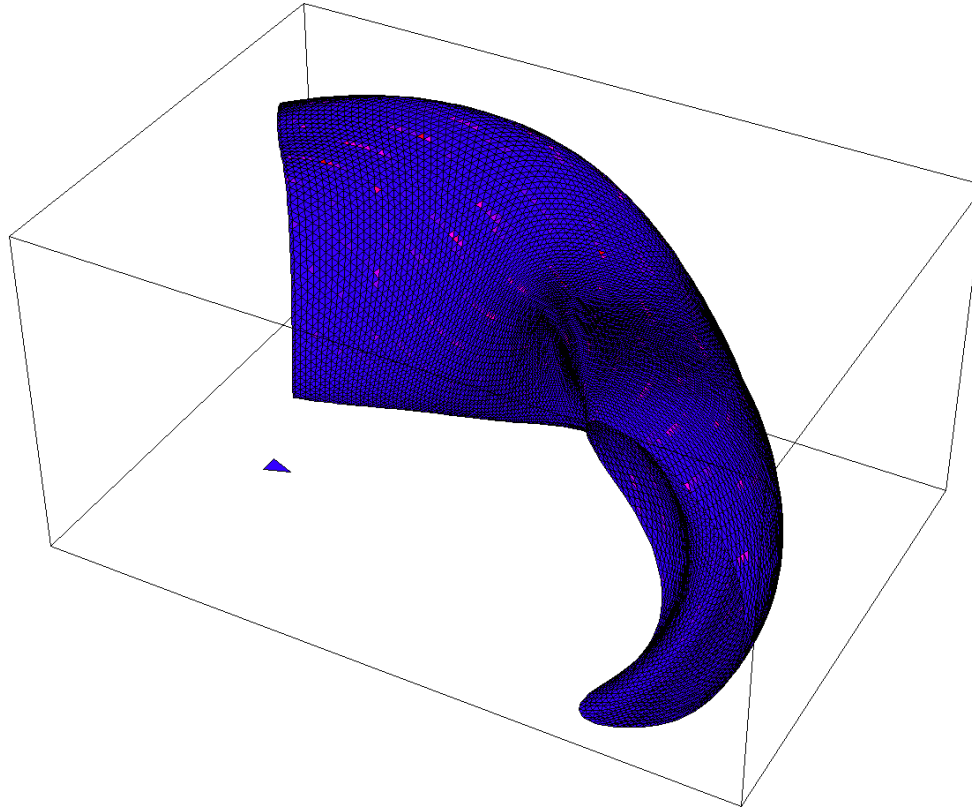


Case1 Continued...





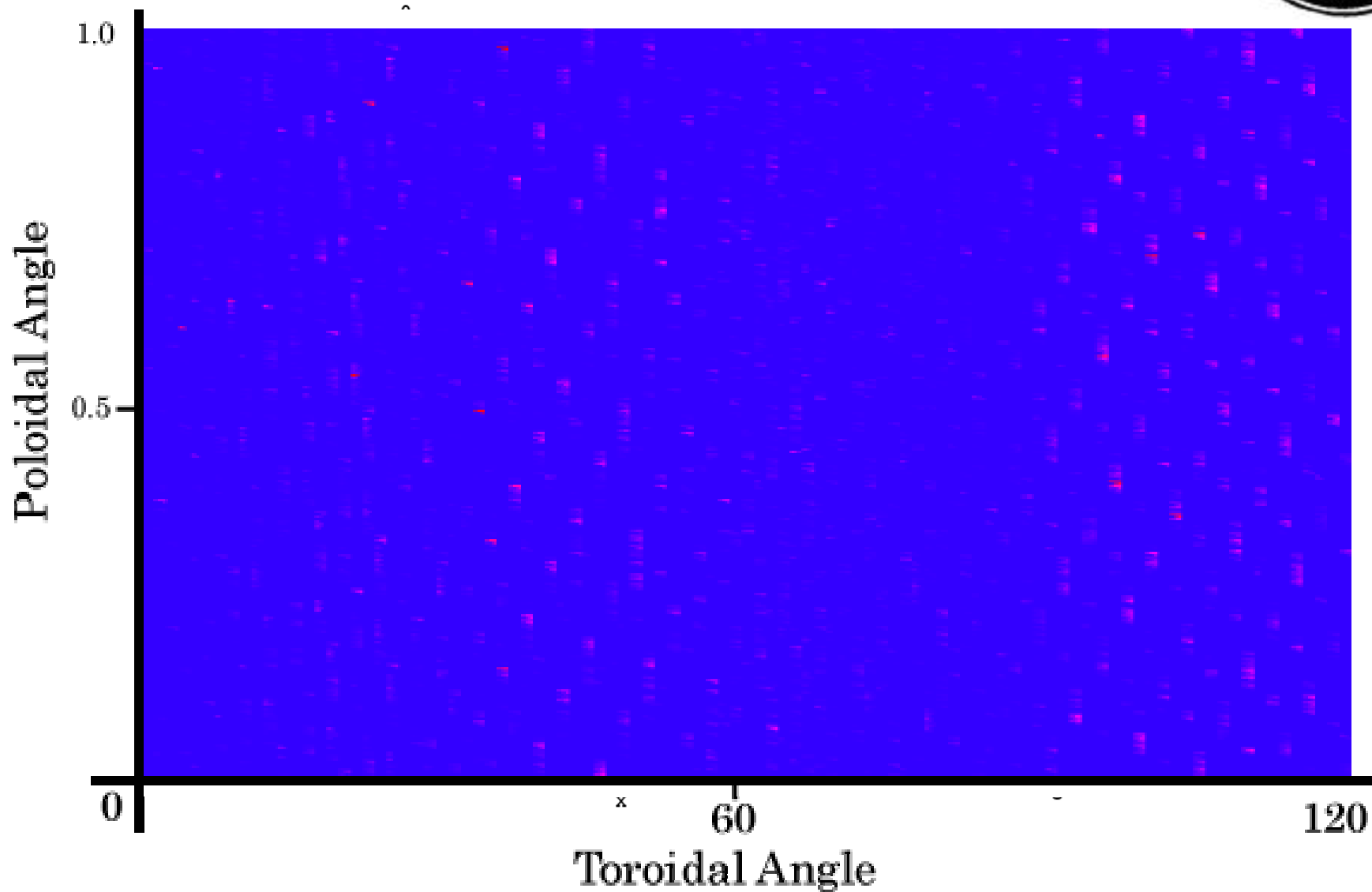
Case 2: Truly Conformal



- Need to specify real space coordinates
 - Pros: Accurate, Real Space, “Platelets”
 - Cons: What size area to use?



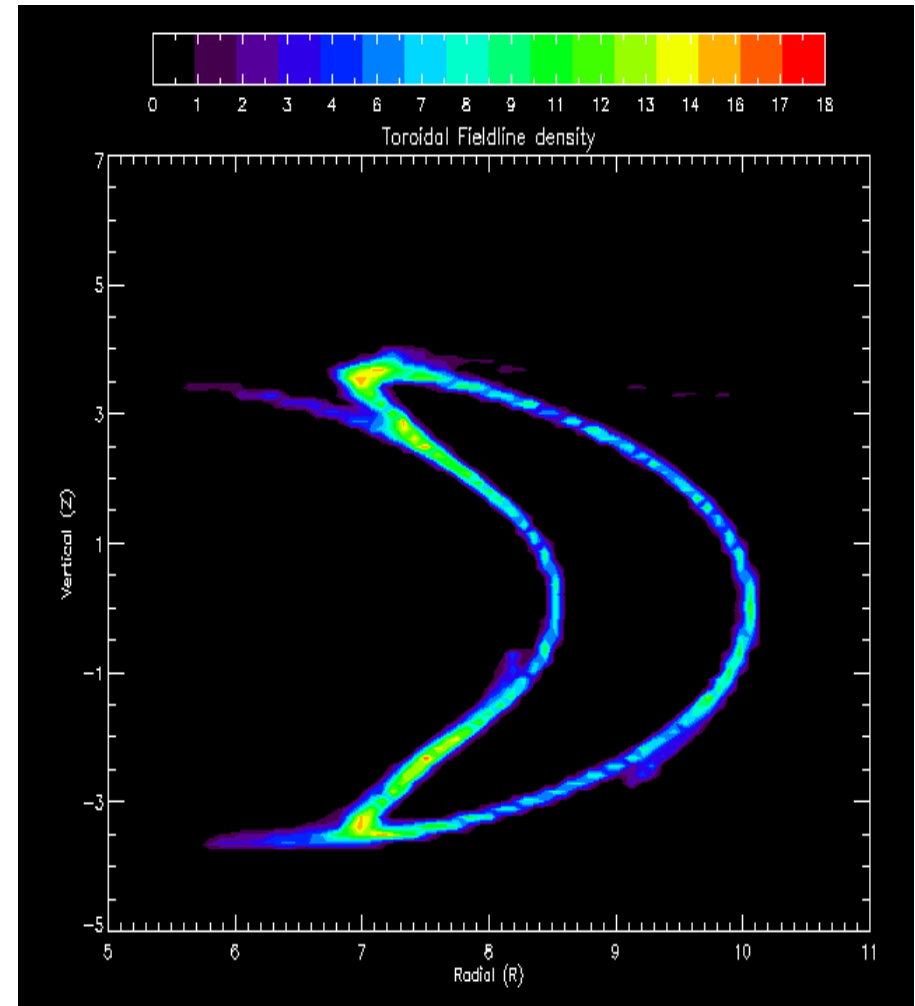
Case 2...





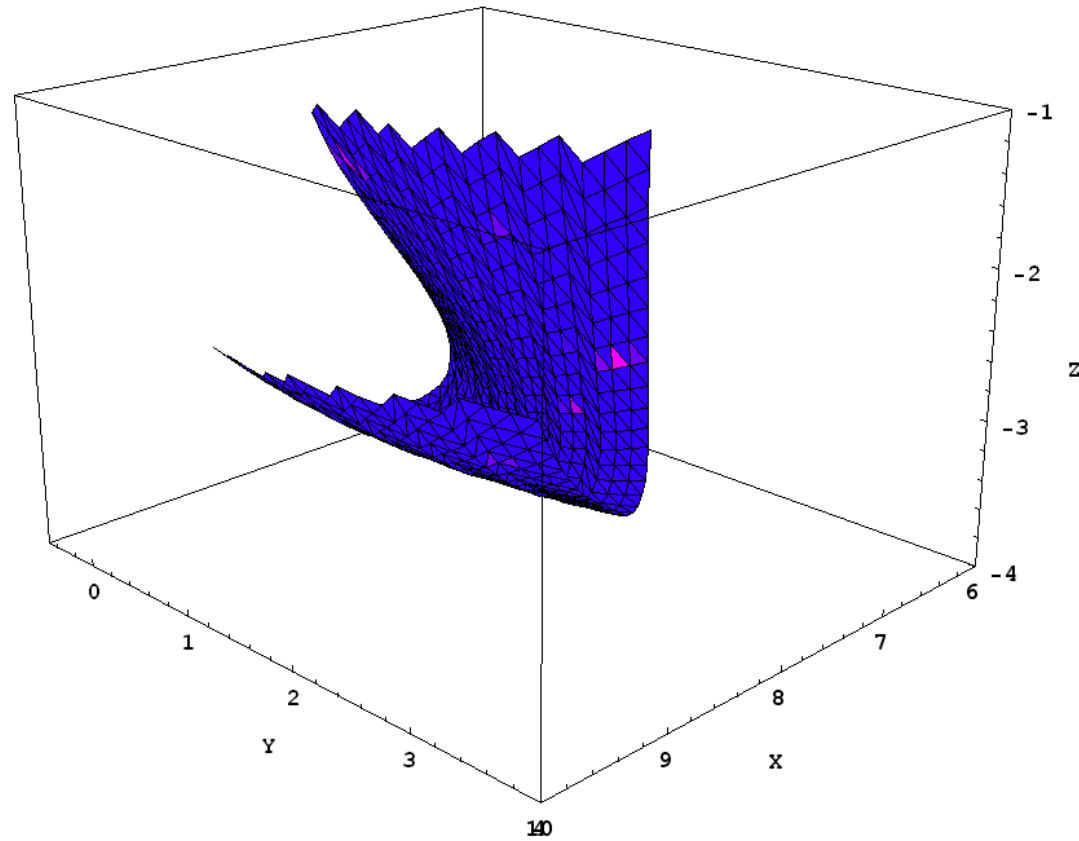
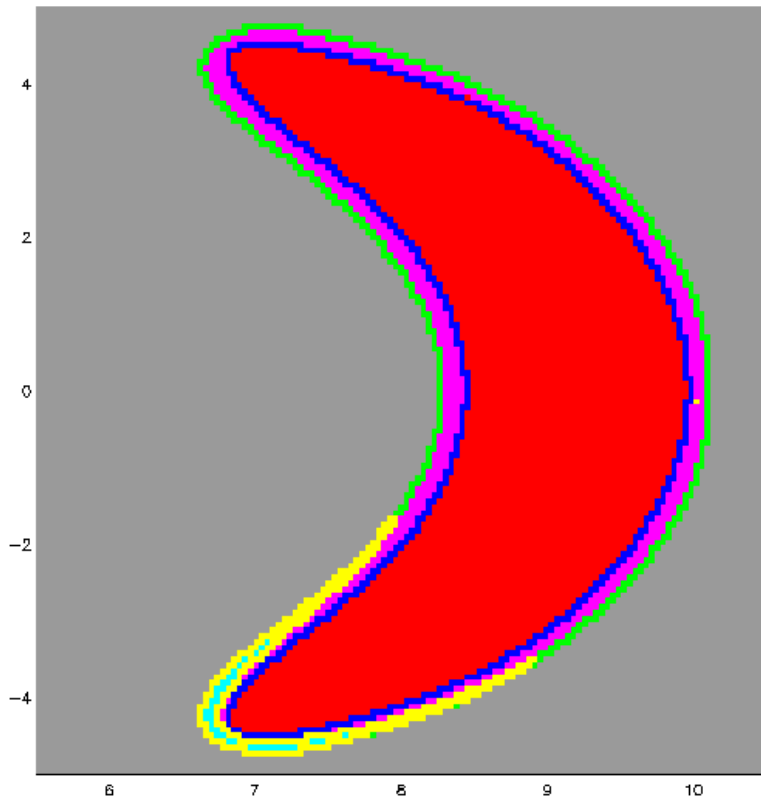
Case 3: Flowing with Lines

- Need other Indicators
 - Radial Field Line Density
- Follow the Helical Edge
- Set Wall Back





Case 3...





Case 3 Advantages

- Initial problems with Baffles
 - Angle plate in Poloidal/Toroidal direction
 - $\frac{1}{2}$ intercepted but $\frac{1}{4}$ hit sides

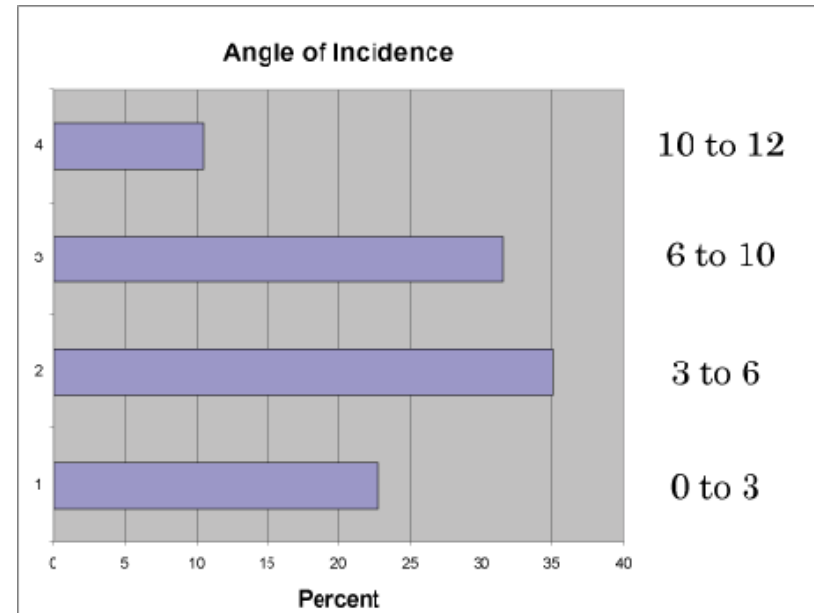
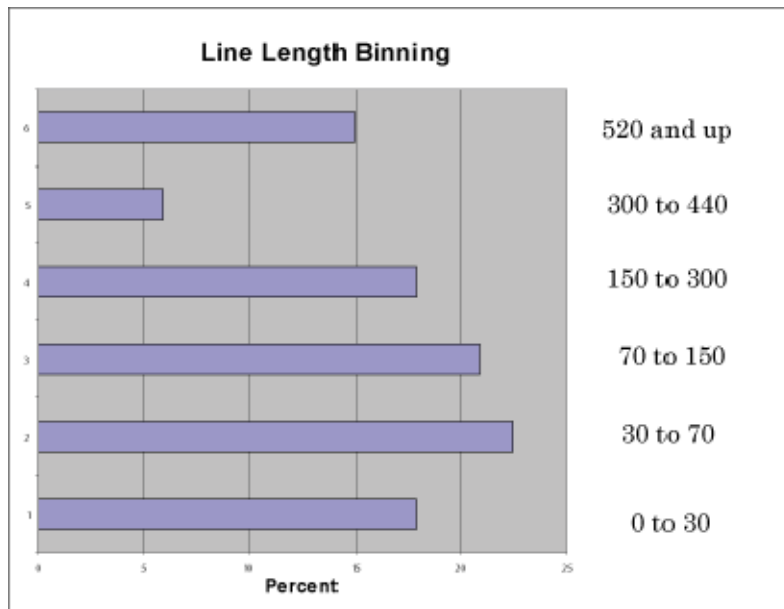
- Tilt with Field lines
 - Large Improvement. $\frac{2}{3}$ Hit, few on sides

- How close can we get to LCMS?



Case 3 stats

- Maximum Platelet Heatload = 5% of Power
- Ave Plate Length = 424 m
- Ave Wall Length = 30 m





Summary and Outlook

- Ergodic design robust
- Details important in close quarters
- Plate not necessarily conformal
 - Poloidal versus Toroidal Strike Strips
- Tilting with the Field Line is Beneficial
- High Line interception achievable