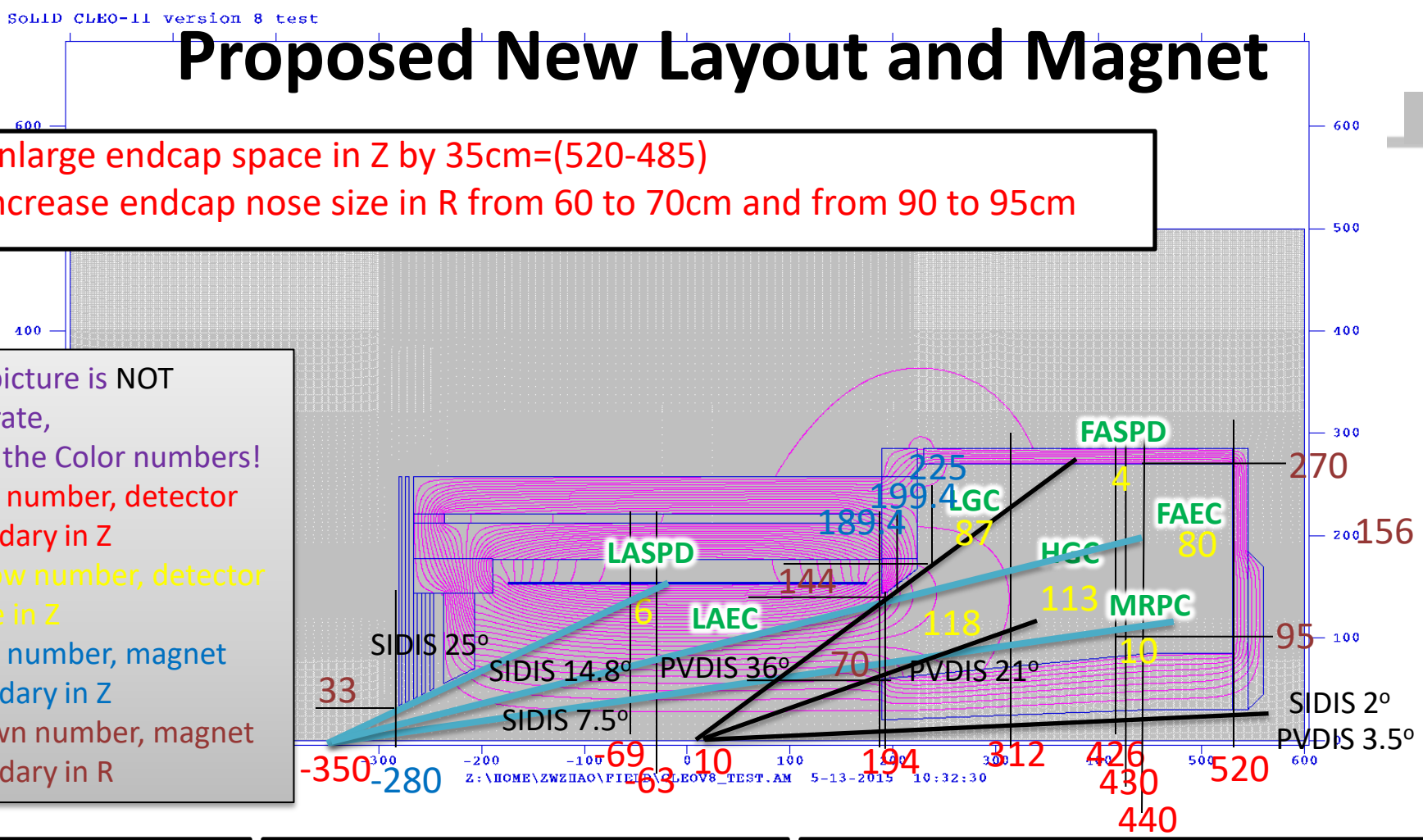
# Proposed New Layout and Magnet



enlarge endcap space in Z by 35cm=(520-485)
increase endcap nose size in R from 60 to 70cm and from 90 to 95cm




The picture is NOT accurate,
Read the Color numbers!

- Red number, detector boundary in Z
- Yellow number, detector space in Z
- Blue number, magnet boundary in Z
- Brown number, magnet boundary in R

| | |
|---|---|
| 144cm | Cryo Rin |
| 70cm | Endcap Nose tip Rout |
| 95 cm | Endcap Nose flat Rout |
| 426cm | Endcap Nose flat front Z |

atan((95-70)/(426-189))/3.1416*180=6° Endcap Nose slope

(350-280)*tan(25/180*3.1416) =33cm front plug Rin

| | |
|---|---|
| (350+440)*tan(7.5/180*3.1416) =104cm | FAEC Rin(phys) |
| 104 – 9 = 95cm | FAEC Rin(eng) |
| (315+500)*tan(15.8/180*3.1416)=231cm | FAEC SIDIS Rout(phy) |
| 231+ 9 = 240cm | FAEC SIDIS Rout(eng) |
| 265cm | FAEC PVDIS Rout |
| (350-63)*tan(14.8/180*3.1416) =76cm | LAEC front Rin(eng) |
| (350-13)*tan(14.8/180*3.1416) =89cm | LAEC rear Rin(eng) |
| 3.1416*(265*265-95*95)/1e4 = 19.2 $m^2$ | area FAEC PVDIS |
| 3.1416*(240*240-95*95)/1e4 = 15.3 $m^2$ | area FAEC SIDIS |
| 3.1416*(140*140-80*80)/1e4 = 4.1 $m^2$ | area LAEC SIDIS |

| | |
|---|---|
| atan(144/(195-10))/3.1416*180=35.8° | PVDIS Max angle |
| atan(70/(189-10))/3.1416*180=21.4° | PVDIS Min angle |
| atan(135/(350-63))/3.1416*180=25.2° | SIDIS Max angle |
| atan(144/(350+195))/3.1416*180=14.8° | SIDIS Middle angle |
| atan(70/(350+189))/3.1416*180=7.4° | SIDIS Min angle |
| atan(135/(315-63))/3.1416*180=28.2° | JPis Max angle |
| atan(144/(315+195))/3.1416*180=15.8° | JPis Middle angle |
| atan(70/(315+189))/3.1416*180=7.9° | JPis Min angle |

# Cables



| | Total area(cm2) | Location to go out | comment |
|---|---|---|---|
| FAEC (PVDIS) | 1800 | Endcap Back plate | 1800 1.1cmD fiber bundle, 1800 0.3cmD fiber bundle |
| LAEC (SIDIS) | 500 | near downstream collar? | 500 1.1cmD fiber bundle, 500 0.3cmD fiber bundle |
| LASPD | 2? | near downstream collar or solenoid front? | 60 HV, 60 BNC |
| LGC | 30 * 5? | Near downstream collar or endcap side? | 270 5mmD HV, 270 3mmD BNC |
| HGC | 30 * 10 | Endcap side | 480 HV, 480 BNC<br>2 gas line at top, 2 gas line at bottom |
| GEM (PVDIS) | | Near downstream collar or endcap side? | |
| GEM (SIDIS) | | Near downstream collar or solenoid front? | |
| MRPC | | endcap side | |

# Old slides

Just ideas here, but changes are clearly needed

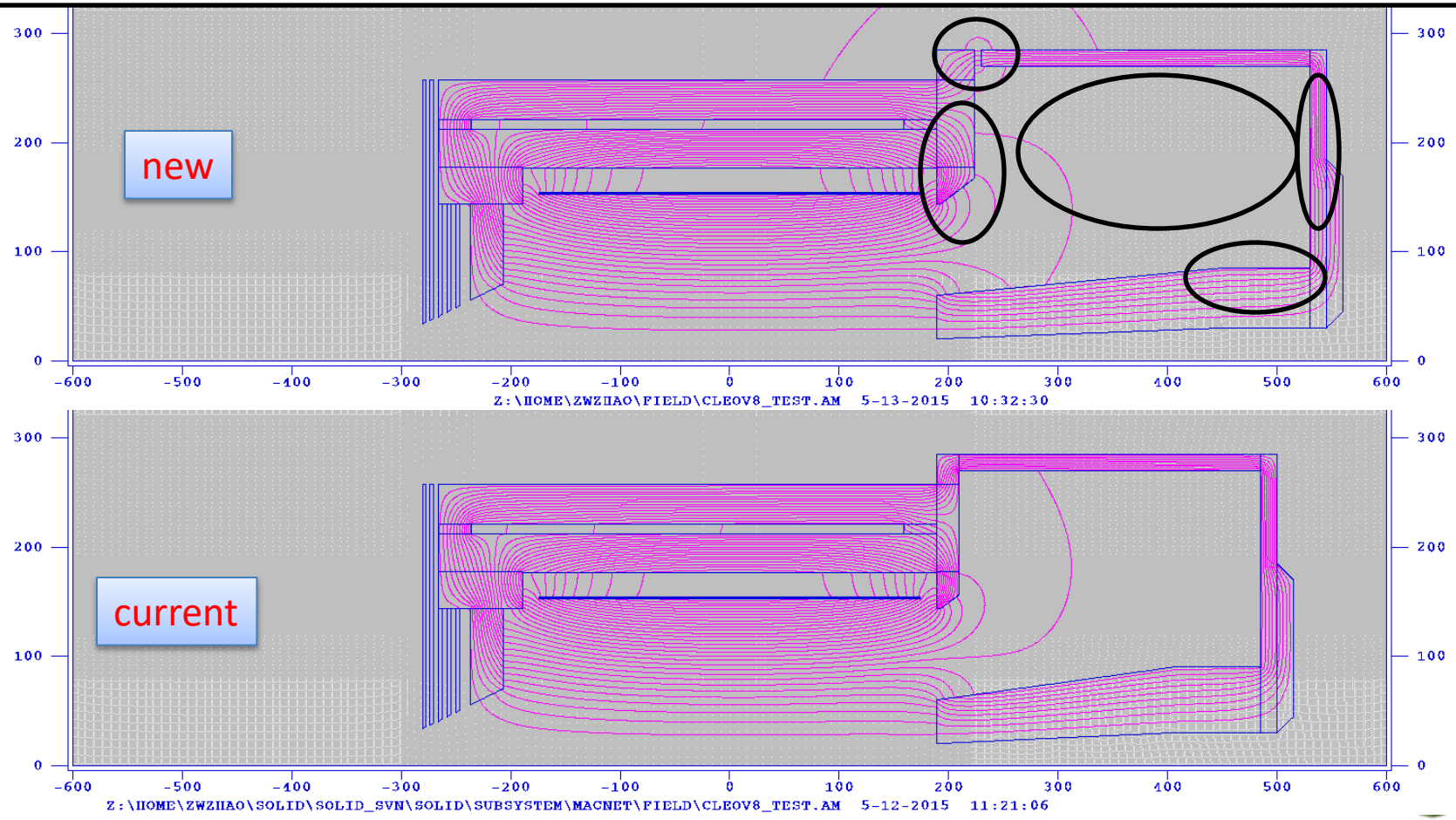
- Downstream collar enlarge by 15cm in z (needed for engineering)
- Endcap enlarge 30cm (SIDIS setup needs room)
- Endcap nose back reduce 5cm in r (EC hexagon module needs room)
- 6cm gap between downstream collar and endcap (let cable out, more cable out at back needed)
- possible impact, PVDIS EC large angle performance

Need design with full 3D model and satisfy both physics and engineering requirement

needed by all subsystems to fix their design, must be a coherent effort

More realistic design now, More saving of man power, effort, cost, maybe even physics

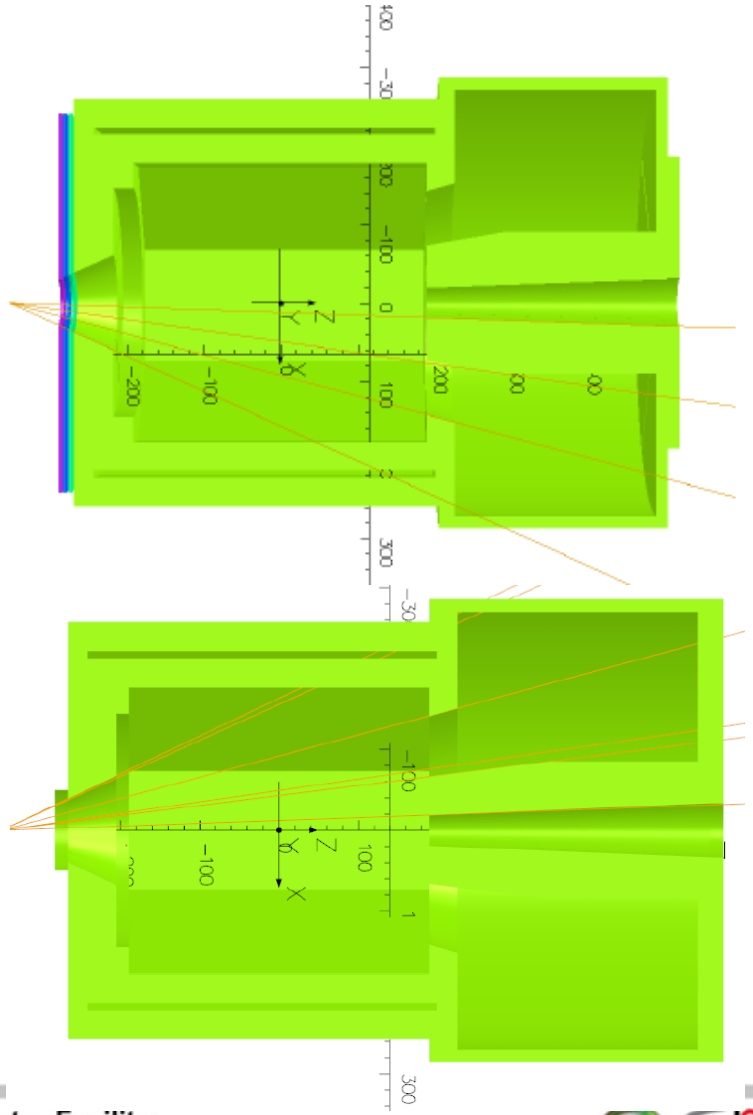
Zhiwen's old slide



# Jay's new model



- Model 1
  - SIDIS Opening 8-24 deg
  - Endcap nose outer_r=90cm
  - Endcap length_z=261cm
  - Downstream collar 15cm thicker than current
- Model 2
  - SIDIS Opening 7-25 deg
  - Endcap nose outer_r=85cm
  - Endcap length_z=304.8cm (10ft)
  - Downstream collar 15cm thicker than current



# Jay's questions



- 1. how long should endcap interior be, including contingency for detector changes? The one shown is 304.8 cm. Zhiwen's model has 261 cm.
- 2. what should OD of endcap central cylinder be? Range 85-90 cm. One could slot a 90 cm cylinder and recess Thomson rails: intermediate steel case.
- 3. what size radial holes are needed at what endcap Z locations for cables? 24 2" diameter with external compensatory steel?
- 4. how much will ~2 G excursion in Bz over 60 cm He3 target affect it?

# Zhiwen's thoughts



- 1. "Downstream collar enlarge by 15cm", will LGC can redesign tank and keep PMT at same location, thus preserve same performance?
- 2. HGC wants 10cm in Z to allow tolerance with pressured thin windows.
- 3. Is the current space good in Z and R for SPD, GEM, MRPC, baffle, EC at engineering level? If not, what change do you want?
- 4. What is the size of the crosssection area of cables of your detector going out? Where is the preferred location you want them to go out?