PVDIS BAFFLES AND SOLID RAILS

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At the March 2017 SoLID collaboration meeting, Whit Seay presented preliminary ideas about support systems for the SoLID apparatus including the PVDIS baffles. The latter would be supported by a set of longitudinal rails mounted inside the cryostat, as shown in Fig. 1. They run the length of the cryostat, with the downstream end anchored to the

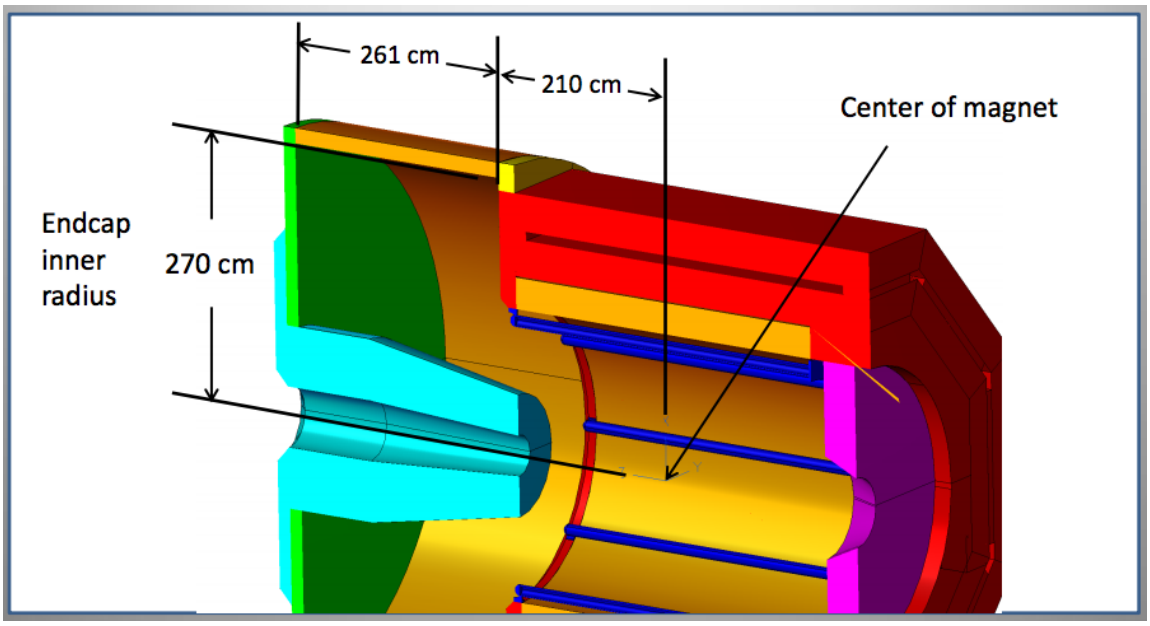

FIGURE 1. Rails (blue) mounted inside cryostat

steel collar at the end of the coil. The rails would be 4 inches (101.6 mm) in diameter, and would be mounted about 2 inches (50.8 mm) from the inner surface of the cryostat. The cryostat inner diameter is about 1440 mm, so the rails would be centered about 1338 mm from the beam and the minimum distance from the rails to the beam would be about 1288 mm. The number of such rails has not been specified; the drawing suggests 8 of them but more or fewer might be used.

One such rail is indicated schematically in Fig. 2, showing its relationship to the PVDIS apparatus. The first nine baffle plates have outer diameters less than 1288 mm. However plates 10 and 11 are larger than this, so the rails would need to pass through these plates.

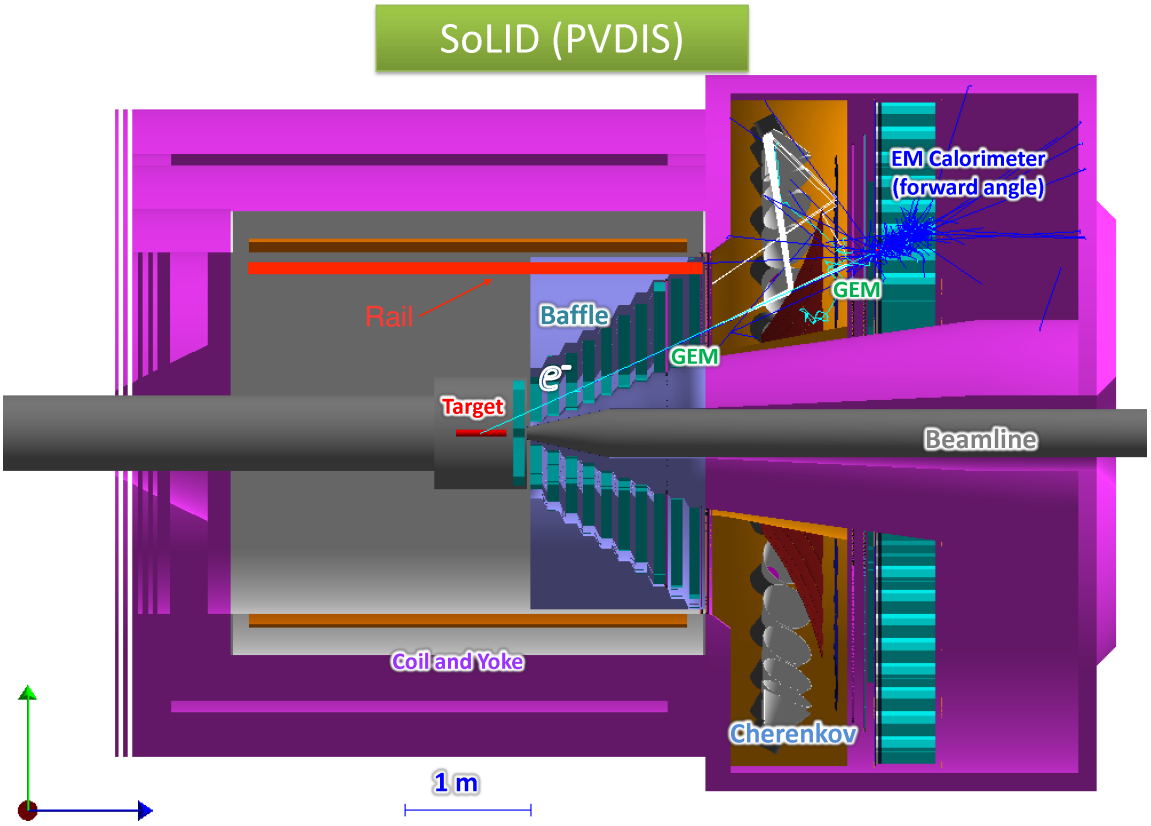

FIGURE 2. Rail (red) in context of PVDIS layout

Figure 3 is a representation of baffle plate 10 with a red circle representing a 4" diameter rail, centered on the y axis, superimposed. This plate has an outer radius of 1317.5 mm. To accommodate the baffles, there would need to be small indentations in the outer ring. This should have minimal physics impact.

Figure 4 is similar for plate 11. Here the outer radius is 1400 mm, and the slits (the white areas) extend to 1320 mm. Fortunately the rail does not intersect the slits. (Note: the angular orientation of the baffle should be correct, assuming the light gas Cerenkov's sector 1 begins on the y axis.) However, a 4" hole at this position would leave only a whisker thin piece of baffle material in places. The rail standoff is not shown but presumably would require further cutting into the baffle material. Particularly if the baffle material is lead, this seems likely note to be mechanically acceptable without some reinforcement, which could cut into the slit size at the outer radius.For 6 or 8 rails the physics impact seems likely to be small, depending on the details of the reinforcement design. Note that 6 rails evenly spaced at 60° intervals would intersect 6 baffle spokes in the same way, but if there

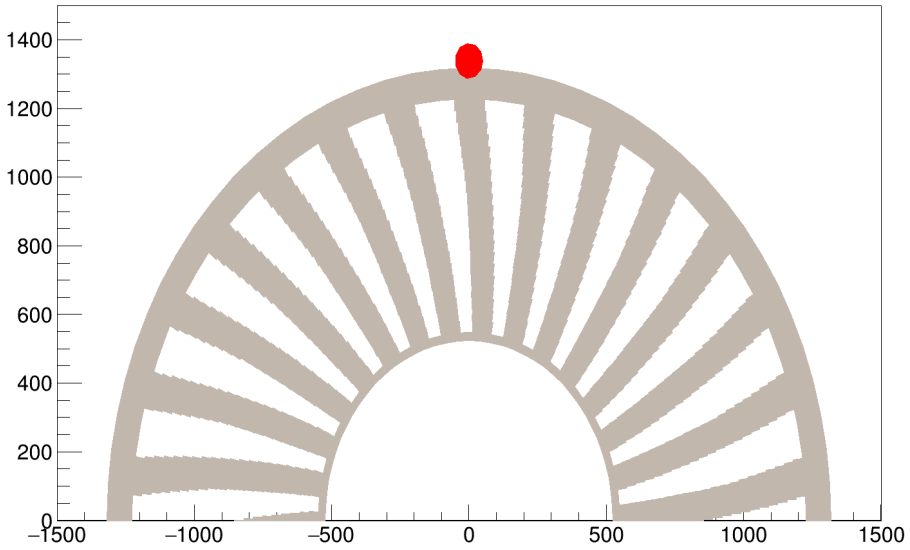

FIGURE 3. Rail (red) and baffle plate 10 (grey)

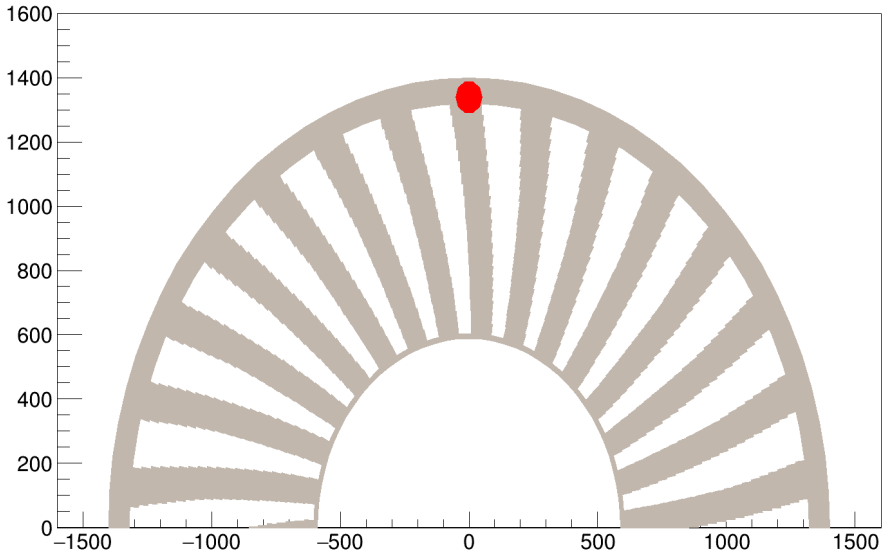

FIGURE 4. Rail (red) and baffle plate 11 (grey)

are 8 rails (or any other number not a factor of 30) they would need to be unevenly spaced at multiples of 12° if they are all to have the same position relative to the baffle structure.