

Ron G and G Ron,

Some questions on the straw tube chambers.

Number of straws: The submitted proposal says a total of 2850 straws are needed, with 10% waste assumed, giving a needed ~3100 straws. The StrawPlan document calls for 4000 straws, which is 1150 spares, so maybe 1000 spares after some spoiled straws. Given their cost, that seems high. Unless we have some past evidence from PANDA of high failure rate, I would not use a number much bigger than 10%. 3100 or maybe 3200 seems like a more reasonable total number.

Building speed: The StrawPlan says 10-15 straws/day. On the low side of 10 a day, that's 320-400 days (for 3200 or 4000). Assuming a 5 day work week, that's 64-80 weeks. On the high side of 15/day, the range is 42-53 weeks. The StrawPlan allows 52 weeks. Even at the highest speed and fewest straws, this is cutting it fairly close. I'm concerned on the time estimate from a 10,000 straw project. With the Rutgers FPP we started out assuming stringing a straw took ~1 minute, a number we got from someone (RG can probably remember). Eventually, we did get to that number, but when we started the number was more like 10 minutes/straw. I don't think we'd made it through even half the straws when our estimated time ran out.

So, this estimate really needs to be tuned up. We need to break it down into the component steps: stringing, pressure/leak testing, gluing. What's the time estimate for each step, and what's that based on? What's the work mode? E.g., how many straws are made before gluing and testing? Are there elements that will require having two people at once (stringing, for example)? This is a big risk if a trained person quits and you need to find a second person.

It appears you will have two graduate students working on this as the only labor. Do you anticipate the students will be putting in a 40 hour week doing nothing but this? What's the technician's job? Is he full time or part time? The \$30K for a grad student working 2000 hours/year is \$15/hour. Could you find cheaper undergrad labor for part of this?

Also, a technical question. The PANDA report seems to imply the being over-pressured is needed for stability. What happens when there is no over-pressure? Do they really keep it pressurized all the time after construction?

Component part cost: Can you provide more details on where these came from? I am particularly concerned on the pins. Where will these be manufactured? We had a hard time finding someone for the Rutgers FPP, and I believe the cost was somewhat more than originally planned. The costs in the submitted proposal are for 3100 straws, not 4000. It would be good to get a quote for those elements as soon as possible, if you don't have one.

Timing: How many straws are needed for the chambers in 2015?