Hall A GEM Gas Distribution System Meeting

Date: August 2, 2019
Time: 13:30 – 14:45

Attendees: A. Brown, P. Campero, E. Cisbani, B. Eng, K. Gnanvo, G. Jacobs , T. Lemon, N. Liyanag, M. McMullen, B. Sawatsky, J. Segal

1. SBS/BB gas distribution (K. Gnanvo, N Liyanag, J. Segal)
    - 1.1. A presentation to define the gas distribution needs for SBS/BB should be confirmed with details on the number and sizes of the gas lines to be run to the planned location.
        - 1.1.1. BB lines and sizes
            - 1.1.1.1. There will be a total of 7 BB gas lines. 6 layers, 1 line per layer. Plus1 additional spare line. All supply lines will be ¼".
        - 1.1.2. SBS lines and sizes
            - 1.1.2.1. There will be 44 total SBS lines. 40 SBS operational layers with 4 spare layers. Each layer will have its own line. All supply lines will be ¼".
    - 1.2. Confirmation of a breakdown of the flow needed for each type of line:
        - 1.2.1. INFN Layer/module flow requirements.
            - 1.2.1.1. INFN layers are comprised of 3 GEM modules. The gas distribution will provide a single line for the entire layer. During the discussion INFN states a flow specification of 10 to 12 L/h per module.
        - 1.2.2. UVA Layer/module flow requirements
            - 1.2.2.1. Each UVA layer is comprised of 4 GEM modules. The gas distribution will supply each individual module. Each UVA GEM module specifies a max flow of 3.4 L/h.
    - 1.3. SBS/BB installation in Hall A
        - 1.3.1.1. During the discussion a plan was developed to locate all distribution connections, flow controls, and instrumentation to the pivot. This will give Hall A the flexibility to change the location of the plastic gas line runs as needed.
        - 1.3.1.2. During the GMn + Gen-RP experiment the BB arm would be comprised of 4 INFN (Forward) layers and 1 UVA (Back) layer for a total of 8 gas line. The SBS arm would contain 2 INFN layers and 10 UVA layers for a total of 42 gas lines.
          The maximum distribution would be 7 INFN (including a spare line) and 44 UVA modules, or 51 gas lines.

2. SBS/BB gas distribution diagram and system cost (G. Jacobs)
    - 1.4. DSG has developed a gas distribution concept which will provide flexibility for different configurations of the SBS/BB detector experiments.
        - 1.4.1. George detailed the latest distribution P&I diagram, which implements rotometers for flow control.
            - 1.4.1.1. Hall A requested slight adjustments to the distribution. George will allocate more lines to the SBS by changing the 4 output manifolds to 5 output.
        - 1.4.2. George went over the detailed cost estimate and gave total costs for a system with flow readout ($23K) and without ($12.6K).

3. Honeywell Zephyr flow sensor testing (B. Eng)
    - 1.5. DSG has sourced a sensor which may be suitable for the SBS/BB gas distribution system. Preliminary test results should be discussed.

1.5.1. Brian presented the results from testing the Honeywell flow sensor. In his testing he compared the accuracy of the Honeywell sensor to an MKS GE50a MFC (DSG standard high precision flow controller), the Honeywell sensor was within +/- 2 sccm of the MKS with a faster reaction time.

1.5.2. The Hall A contingency expressed concerns about the radiation hardness of the sensor and supporting electronics.

1.5.2.1. DSG supplied one of the sensors for installation in the hall during beam, to test durability under the harsh environment.