Dear Hans and dear Itzhak,

In accordance with Han’s remarks addressed to FFD design, I have made next attempt to improve the azimuthal symmetry of FFD array. Good detector must be elegant solving its tasks.

A new modular array, shown in attached figure, looks much better from my point of view. Here the maximum diameter of the beam pipe is 90 mm. Also 4 single channel modules were applied to get better azimuthal symmetry (shown as brown squares). The MCP-PMTs of these modules do not exist at this moment and I will have to ask Photonis to produce such photodetectors for us.

To reflect my position I would like to underline that

1.       The main task of FFD is providing excellent time resolution for TOF measurements. Here the FFD is unique and the largest start detector today operating in a strong magnetic field.

20 years ago, it was our dream to get so good time resolution and nowadays it can be realized with large area MCP-PMTs from Photonis (my opinion is based on my 40-year experience in precise TOF measurements with fast scintillators and PMTs).

I do not see any other method of start signal production with picosecond time resolution in MPD at this moment.

2.       The second task is fast triggering collisions in center of MPD setup. Here the FFD used as vertex detector for fast determination of IP position in Au+Au collisions. But for this task some additional options can be used in addition – fast signals from TOF detector, FHCAL, etc., accelerator, plus 2nd level trigger with fast algorithm of TPC tracking to confirm that IP position lays in center of MPD. I guess these options can be applied for p+Au collisions and collisions of light-mass nuclei.

Other tasks for FFD have to be considered as additional options.

The modular design of FFD is based on 5- year development and study of prototypes. Now I do not see any better solution providing

-          Good optical contact between quartz bars and MCP-PMT window,  
-          Stable operation of GHz- front end electronics with low level of noise thanks to good grounding and screening,  
-          Several versions of module mechanics were made and I believe now the module looks elegant, it allows easy assembling, and it has small mass and dead space in front.

Hans, you propose a new thin and well granulated detector in front of FFD:

”I would add in front of both FFD a silicon Pad detector with dE/dx in each pad, which we had in WA98, built by B. Wysloch for  little money! There we could also measure directed flow and more.”

As for me your idea of thin and well granulated detector in front of FFD looks fine. I guess it will be good contribution if any team will participate in MPD experiment with such detector. In this case z-position of FFD can be increased from 140 cm to 150-160 cm without essential decreasing of the detector capabilities.

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But any way, this idea must be discussed with MPD management (V. Kekelidze, S. Golovatyuk).

Best regards,

Volodya