

Minutes of the October 1, 1992, meeting on the PS wire scanner project

Present: V. Agoritsas, J.P. Bovigny, E. Falk, H. Koziol, G. Martini, J. Olsfors,
T. Pettersson, M. van Rooij, Ch. Steinbach.
Excused: F. Hoekemeijer

Reliability of wires and tests in the lab

Evaluation tests have been performed first with beryllium wires. They showed clearly that breakage happened at the end of deceleration, when the sudden change of current in the motor was maximum. The LeCroy PC resident RT routine for the wire movement was modified to reduced the braking current (the braking time is longer but the end position is still reached within the time limit).

In the mean time, we benefited from the experience of our SPS colleagues and introduced the technique of copper coating the wire extremities and soldering them to the socket with ceramic bead. Tests have then be resumed with a new 30 μm single fibre carbon wire, mounted in this manner, which broke after 885 movements.

The next test was performed with a multi-fibre wire (about 18 slightly twisted fibres of 7 μm diameter each, copper coated and soldered to the support). This wire was flipped for more than 5000 movements without breaking. Though we do not have much experience with this new setting yet, it seems to be an important improvement and a record in wire lifetime since the first installation of wire scanners at the PS in 1984. More tests should be made to improve the confidence and possibly further improve the wire fastening. During the test, we had to change a bellows (vacuum leak) and to tighten the cam springs.

Choice of straight sections for the new monitors

SS 88 and 75 were foreseen for the horizontal and vertical monitors. But SS 88 should be kept free in view of a possible other use, and SS 64 was proposed instead. This change is agreed upon, noting that the FT61 line is just outside so that the mechanism must be mounted inside the machine. The sextupole will be mounted upstream, then the wire scanner tank with the mechanism upstream (to avoid high magnetic field on the angular resolver). In SS 75, the tank will be placed upstream with the mechanism downstream next to the quadrupole.

Both tanks will be modified to increase the available space left in the straight section from 300 mm to 350 mm. This space will be gained by shortening the pipe on the side opposite to the mechanism. The vacuum chambers for the remaining part of the straight sections will be lengthened accordingly.

Cables

The list of cables has not been completed yet. G. Martini will centralize the requests and forward them to the ST division next week. Twisted pairs are requested for the resolver input and output. 2 coaxial cables are considered for the monitors (one for the system itself and one for the analog signal observation). The location of the electronics has been further discussed. Installation in the CCR (MR 318 and 319), though more comfortable, increases the price of the cables.

Scintillators and P.M.'s

Further evaluation tests of the Hamamatsu R2238-01 photo multiplier performances suffered from delays due to the breakdowns of a power supply and of a dynode voltage resistor divider. They gave again good results recently, but the tests must be made with the head (adapter) amplifiers and the LeCroy Camac acquisition system to improve the linearity and suppress the beat between sampling and proton bunches. The need for optical filters has been discussed again. They are at least necessary for the evaluation of the system linearity.

VME and specific electronics

There seems to be no precise date for the availability of the timing module TG8, but E. Falk says that we can manage without, using the existing PLS receiver VME module and a standard Preset Counter, as J. Tedesco did in the Beam Transformer DSC. The printed circuit for the synchronization and excitation of the position resolvers works well. J. Olsfors is in contact with Siemens about the radiation hardness and the mechanical stress of the resolvers. It may be necessary to mount them on the other side of the motor, together with the tachometer. The assembly of the specific electronic will have to be considered soon.

Software

The software consists of 4 major parts:

- The interactive application program, running in work-stations,
- The equipment module,
- The specific program including the data processing,
- The real-time task for the wire movement and data taking.

The first one may be written in C under UNIX, X-window and MOTIF, but also in X-NODAL. It should be given to a specialist in work-station application programs and could be made within the OP group.

The CO group will take care of the equipment module (G. Benincasa team) after agreement on the EM calls and the protocol.

The specific and RT tasks are written by E. Falk who has just succeeded the first control of the wire movement. These initial tests showed that braking was not as strong as the acceleration of the mechanism. This must be investigated in more details with the full mechanism and observation of the velocity and current in the motor.

Planning

- Order the cables and the installation in the ring,
- Install at least one multi-fibre wire in the PS before the end of the year,
- complete the PM tests and define the installation,
- start the assembly of the specific electronics,
- specify the input-output to the EM.

Vibration tests

G. Martini will look for a stroboscope with a repetition above 1 kHz (4 kHz is the optimum) in view of taking stroboscopic pictures of the wire during its movement.

Budget

H. Koziol informs that 78 kF have been committed this year. The estimation for the end of the year book closing is between 100 kF and 110 kF.

Conclusion

Important progresses have been achieved recently. But there is still a considerable amount of work to be done before installation during the next shut down and commissioning in March. The 2 new monitors will then be installed in SS 64 and 75 and run in the new system. The 2 old monitors of SS 54 and 89 will be converted and included in the new system later, and the LeCroy system suppressed as soon as there is enough confidence and experience with the new controls.

Ch. Steinbach

Distribution:

V. Agoritsas
S. Battisti
J. Boillot
J. Bosser
C. Bovet
J.P. Bovigny
R. Cappi
E. Falk
B. Frammery
R. Garoby
G. Gelato
S. Hancock
F. Hoekemeijer
K. Hübner
H. Koziol
G. Martini
M. Martini
J. Olsfors
T. Risselada
J.P. Riunaud
K. Schindl
E. Schulte
D.J. Simon
P. Tetu
M. van Rooij
E. Wildner
D.J. Williams