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INJECTION AT 30 MeV (~ 2,35 MHz)CONSEQUENCES FOR THE NEW RF SYSTEM1. Amplifiers

The coupling networks are designed for the frequency band 2,5 - 10 MHz. Operation down to 2,35 MHz is possible without modification, but for optimum performance some minor improvements would be helpful.

2. Tuning System

The present method of lock-in of the system before injection is based on a fine tuning current of 100 A to overcome both the ferrite "stiction" effect and the tolerances of the individual cores.

If the same method is used for 2,35 MHz injection, the coarse tuning current needed at 9,55 MHz is as high as 3800 A. The present hardware can only supply 3000 A, so that a new rectifier and an additional transistor bank will be necessary (cost ~ 100 ksfr. without spare). The coarse tuning lines to the cavity and the cavity itself must then be protected against thermal overload by an additional interlock, permitting a maximum duty of 62% only.

It is however possible to use the spare CT supply and transistors in parallel with the operating supply to boost the available current to 6000 A without expenditure for new equipment.

Finally, there is some evidence that lock-in is also possible with a pre-current of much less than 100 A, so that even one coarse tuning supply can possibly master the larger frequency swing.

3. Ferrites

The flux density is inversely proportional to the frequency for a given voltage, and the increase of 20% for the present case will drive the ferrites in an instable region. At the other hand, the present amplitude programme demands only 60% of the nominal RF voltage after injection, so that the lower injection frequency should be possible with 7 cavities and some additional interlocks. For safety reasons, it is nevertheless recommended to run 9 cavities with reduced individual RF voltages.

4. Conclusion

An injection frequency of 2,35 MHz is possible from the point of view of the new RF system. Detailed study of some problems is however necessary (estimated time ~ 1 men-month).

W. Pirkl

Distribution :

J. Jamsek

G. Plass