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IMPEDANCE REDUCTION IN THE AGS RF SYSTEM

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Several beam instabilities in the AGS have resulted from the high impedance the rf accelerating system presents to the beam¹. At present there is a program to remove (by shorting the gaps) some rf accelerating stations to reduce this impedance. The total accelerating voltage is maintained by operating the remaining rf station at a proportionally higher voltage level. It is expected that an impedance reduction of 0.8 can be obtained in the near future by this approach, and when improved voltage monitoring is added by A. Tranis, additional cavities can be shorted reducing the impedance by 0.6.

If instead of removing this hardware from service, it is reconnected as shown in the attached sketch, a further impedance reduction can be attained. With the working gaps reduced by 0.8 the impedance is reduced by 0.7, or when the working gaps are reduced by 0.6 the impedance is reduced by 0.4.

The circuit, when reconnected, will power all the ferrite to the same flux levels, present the same drive impedance to the rf system, and will have the same tuning characteristics. It is, therefore, compatible with

unmodified rf stations. This will make it possible to make improvements in steps quantized by stations. The removal of rf stations is quantized by station pairs due to the requirement to keep the rf system balanced.

The circuit sketched constitutes a major reworking of the rf and dc interconnections. Since these interconnections determine in a strong way the resonances at higher frequencies they must be carefully modeled before being deployed. This work will take several months, but I do not believe there are any problems that could not be solved given sufficient effort.

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