

Capture Efficiency vs. Impedance of RF Cavities

M. Q. Barton

November 1973

Collider Accelerator Department
Brookhaven National Laboratory

U.S. Department of Energy

USDOE Office of Science (SC)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No.AT(30-1)-16 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

AGS Studies 0001-0200, Nov 14, '73

Blumberg
No. 45

Barton, Raka, Gill.

One of the experiments of Oct 24 was repeated. Namely, cables were inserted in each side of the signals going to the phase detectors in the cavity tuning servos. The cables were 12 n sec long so that the cavity reactance should tune to about 18° off resistive. By putting the cables in both sides, both the ~~new~~ inductive and capacitive cases were examined. In this case, the AGS was tuned to quasi-adiabatic capture. The intensity was $\sim 7 \times 10^{12}$ on early monitor and $\sim 4.5 \times 10^{12}$ on late monitor. General capture behavior was monitored and one of the tuning servo vernier signals was explicitly watched to look for high frequency instability behavior.

Again no effect was observed. The capture process, even with heavy beam loading seems to be insensitive to the reactive component of the cavities. The work done on the rf system by the rf group on Oct 24, if it changed the performance ^{at all}, probably did not do it via the net average reactance of the cavities.