The two toroids in the 500-MeV line tend to pick up kicker noise because of the time coincidence. This problem is still being worked on and hopefully will be resolved.

We use the kicker magnets at low field level to produce a fast coherent oscillation and analyze the fast position signal with a spectrum analyzer.

1. Question:

Do you really need profile monitors in L3 and L4 for injection profiles? You want to match the α and β emittance to avoid unnecessary beam losses and to optimally fill the acceptance of the ring.

N. Radio Frequency Shielding, C. W. Planner, RL

The SNS will use a ceramic vacuum chamber in the regions with magnetic fields, since the fields oscillate at 50 Hz. Our calculations show that the rf wall impedance will be too high for stable beam motion unless something is done to modify the selectromagnetic environment of the beam.

In the SNS, the longitudinal coupling impedance is dominated by the capacitive term, which contains the factor $(1 + 2 \ell n\ b/a)$. We propose to minimize this term by making the chamber radius b equal to the beam radius a. We will follow the beam profile around the machine with a boundary which terminates the beam electric field.

For the transverse coupling impedance the space change term again dominates and contains a factor $(1 - a^2/b^2)$. This term can again be minimized by making a and b close to one another.

The boundary which terminates the space charge field will consist of an array of 2-mm stainless steel wires top and bottom running longitudinally, with plates at the sides in the bending magnets. These conductors permit the synchrotron magnetic fields to penetrate, but electric fields will terminate on the wires and plates. The quadrupole magnets will have no plates, just wires over the pole tip areas.

O. Theory on Beam Induced Electron Multipactoring, L. Z. Kennedy, LASL

Beam induced electron multipactoring is the production and multiplication of secondary electrons as a result of the transverse accelerating fields of many proton bunches acting on a few initial thermal electrons. A simple calculation indictes the possible severity of the problem.

Let N_o = number of initial electrons

N_n = number of electrons after passage of n proton bunches

Y = average secondary electron yield

$N_n = Y^n N_o$.

We have calculated Y for both the short and long bunch cases for PSR, and for aluminum and stainless steel vacuum chamber walls:

	Short	Long
Aluminum	1.41	1.50
Stainless Steel	1.14	1.30

The figures for Al assume relatively clean surface. A possible result of electron multipactoring is desorption of gas from the walls. The above figures, if anywhere near the truth, indicate strong electron buildup and possibly a severe problem. SPEAR has not reported any such prolem, but there are worries about this at Isabelle. There is some fear that electrostatic position monitors may not work. We are investigating this problem with a hardware simulation.

Suggestion from audience is to flash titanium on the surface and forget it.

P. Apparatus for Measuring Beam Induced Electron Multipactoring, G. Spalek, LASL

The surface of the wire becomes part of the experiment. Does not simulate actuality. These are very small wires, but fields are high (completely different). We could read current on the central wire to see if we have a two-surface effect. Flashing Ti is expensive for the whole ring. Titanium pumps and holds gas, worry about pressure bumps. Titanium chambers are better for pressure bumps. Investigate CERN and PEP experience.

Q. Disk and Washer Structure, S. O. Schriber, CRNL

Efficiency of converting rf power to useful beam power was improved by the shaping of cavities as in the high-energy portion of LAMPF and other operating accelerators in the standing wave mode. Additional advantages