KLYSTRON DEPT BREAKDOWN PROJECTS

FUTURE PLANS

- DIRECT-COUPLED CAVITY EXPERIMENTS
  - A protocol is being developed for processing removable buttons, at variable pulse lengths and strict control of vacuum. Experiments will be completely automated for reproducibility and good statistics.
  - SEM studies of surfaces of buttons will be compared to the study of surfaces of high gradient sections of klystrons, accelerators and w/g components.

- COMPUTER SIMULATION OF RF BREAKDOWN IN THE PRESENCE OF SURFACE PLASMA

  Chemtrum is working with UC-B and LLNL personnel interested in performing simulations.
KLYSTRON DEPT' BREAKDOWN PROJECTS

CONDENSED CONCLUSIONS

- "COUPON" STUDIES

- It was determined that some contamination could be avoided by discontinuing the use of certain abrasives in the machine shop.
- Keeping and transporting coupons in alcohol (upside down) reduced contaminants markedly.

- RESONANT RING TESTS

- The number of "impurities" (as determined by the SEM) do not correlate with the onset and location of breakdown sites (SEM).
- Breakdown occurs preferentially at grain boundaries, unless the sample has been previously vacuum-fired.
- It is suspected that surface plasma may be a major breakdown factor.
RF VACUUM BREAKDOWN

Occurrence, Experiments & Theory

- KLYSTRON OUTPUT CAVITY DAMAGE
- FLOWER-PEDAL & MAGIC-T DAMAGE
- ACCELERATOR DAMAGE
- "COUPON" STUDIES
- RESONANT RING CAVITY STUDIES AND EXPERIMENTS
- DIRECTLY-COUPLED CAVITY EXPERIMENTS (FUTURE)
- SIMULATIONS (FUTURE)