GROUP 5: DETECTOR ISSUES

In view of r-\(\gamma\) backgrounds at small radius being-Heitler muons "large"

1. Generic Detector Configuration (D. Anderson)
   Physics large cm central \(\Rightarrow\) solenoid magnet
   Si vertex detector w/ pixels
   Gas Tracker \(\Rightarrow\) TPC
   EM/Hadron calorimeter: LAr or Scint-Tile
   Outer muon chambers

2. Survive the B-H muons in the calorimeter
   \(\Rightarrow\) very fine segmentation in x-y-r-\(\phi\)
   B-H muons 1-5 ns early \(\parallel\) to beam (Stoemer)
   Active debate on technology of fast-timing calor.

3. Survive the soft r-\(\gamma\) splash in the Si-vertex detector
   Double layer of pixels (1 mm) effective
   At present estimates of r-\(\gamma\) flux at 2x2 TeV (LeBrun)

4. Physics opportunity: \(\mu \mu \rightarrow \mu \mu X\), particularly \(X = h^0, H^0, A^0\)
   Via tagging of forward muons (Rasa, King)
   High-resolution tagging somewhat incompatible with shielding against soft r-\(\gamma\)S.

5. Physics opportunity: \(r\) beams from straight sections (Ku)
   At 2x2 TeV, \(\sim 100 r\) interactions /sec in 1 kg target
   \(\Rightarrow\) much improved measurements of structure functions
   \(N_s, \sin^2 \theta_W, |V_{ub}|, r\) mixing...

"If you build it, they will come."
PRE-GILMAN ISSUES:
- υ FLUYES AT 100-500 GeV (Monkov)
- θ-γ FLUYES IN NEW LATTICE AT ONE
  LOWER ENERGY (STUMER)

LONGER TERM:
- EXTEND DETECTOR SIMULATION TO INCLUDE
  BENCHMARK PROCESSES: \( \mu\mu \rightarrow l^0 \rightarrow s_u s_{\bar{u}} \rightarrow W W \)

DETECTOR R&D
- SUCCESS WILL DEPEND ON ADVANCES IN SI-PIXELS
  AND IN CALORIMETRY
- PROGRESS PRESENTLY DRIVEN BY LHC.
- FOR TIME BEING, MAINTAIN CONTACTS WITH
  EXISTING R&D PROJECTS RELEVANT TO
  THE MUON COLLIDER DETECTOR.