MACHINE - DETECTOR INTERFACE

Summary - I

O. Napoly, 22/3/99

"Design of the Interaction Region"

1) Progress from Frascati

- **Vacuum pressure studies in BDS** [K. Zapfe]

- 10^{-7} mbar H_2 pressure achievable over the BDS
  (~ $2 \cdot 10^{-9}$ mBar CO / N_2 pressure for beam-gas ($\propto Z^4$)
  ~ only H_2 outgasing taken into account
  ~ CO / N_2 outgasing expected ~ 100 times smaller)

- $6 \cdot 10^{-7}$ mBar N_2 pressure @ IP
  (with H_2 outgasing rate!)

- **Magnetic field calculations for Solenoid (4T) + quadrupoles** (250 T/m) [F. Kircher, S. Klioukhine]

(complement the Nb_3Sn quadrupole design presented in Frascati for $B_s = 4$ T)

- Fast Feedback System @ IP [I. Reyzl]

(~ 2000 orbit corrections / bunch train
~ 200 nm mechanical stability of quadrupole doublets in the detector, required)

- Final focus beam line + γ beamstrahlung collimation (or "dump") design compatible with r = 1.1 cm beam pipe / r = 1.2 cm VDET
[S. Drozhdin, O.N.]

(~ backgrounds levels estimated for $\sqrt{s}$ = 500 GeV & $\sqrt{s}$ = 800 GeV, from
- spent beam
- radiative Bhabha's
- e^+e^- pairs
- beamstrahlung γ's
- SR (dipole + quads) γ's

impact on first ± 150 m from IP)

2) What is left to be done

["beam-beam" backgrounds → cf. N. Tesch]

- Background on low-angle ($\lesssim$ 55 mrad) tagging from low energy electrons + residual dispersion
  (beam-gas + black body Compton Scattering)
- Muons from collimation section
- 3^d CAD of beam line components & layout
  ($\sim \pm$ 20 m from IP)
  (K. Sinram et al. at DESY are ready to include all relevant components)
- Beam Instrumentation : - Polarimeter
  - Spectrometer
  - Bunch length
  .....
- Extraction Beam line + Separator + Dump
  ($\sim$ 80 kV/cm electrostatic separator @ $\sqrt{s}$=800 GeV)
  ~ Backgrounds ??

3) What will be presented at Sitges:

PRELIMINARY

- "TESLA Interaction Region Layout and Issues" [O.N.]
- "TESLA IP-feedback System" [I. Reyzl]
- "Beam-beam Backgrounds & Neutrons" [N. Tesch]
- "Machine background", "hadronic background" and "Instrumentation" covered by generic talks / H. Burkhard, N. da Silva, S. Schreiber