

A Case for the Pressure Bump Study on Dec 27

Key Points:

1. The proposed pressure bump study is essential for deciding the beampipe radius.
 - (a) The sensitivity on beampipe radius depends on scattering location.
 - (b) Current pressure bump data is not sufficient.

2. The deadline of beampipe radius decision is end of Jan 2001 - SVD2.0 upgrade depends on it.
 - (a) The beam will come up again around Jan 20th.
 - (b) → Needs a pressure bump before the end of run.

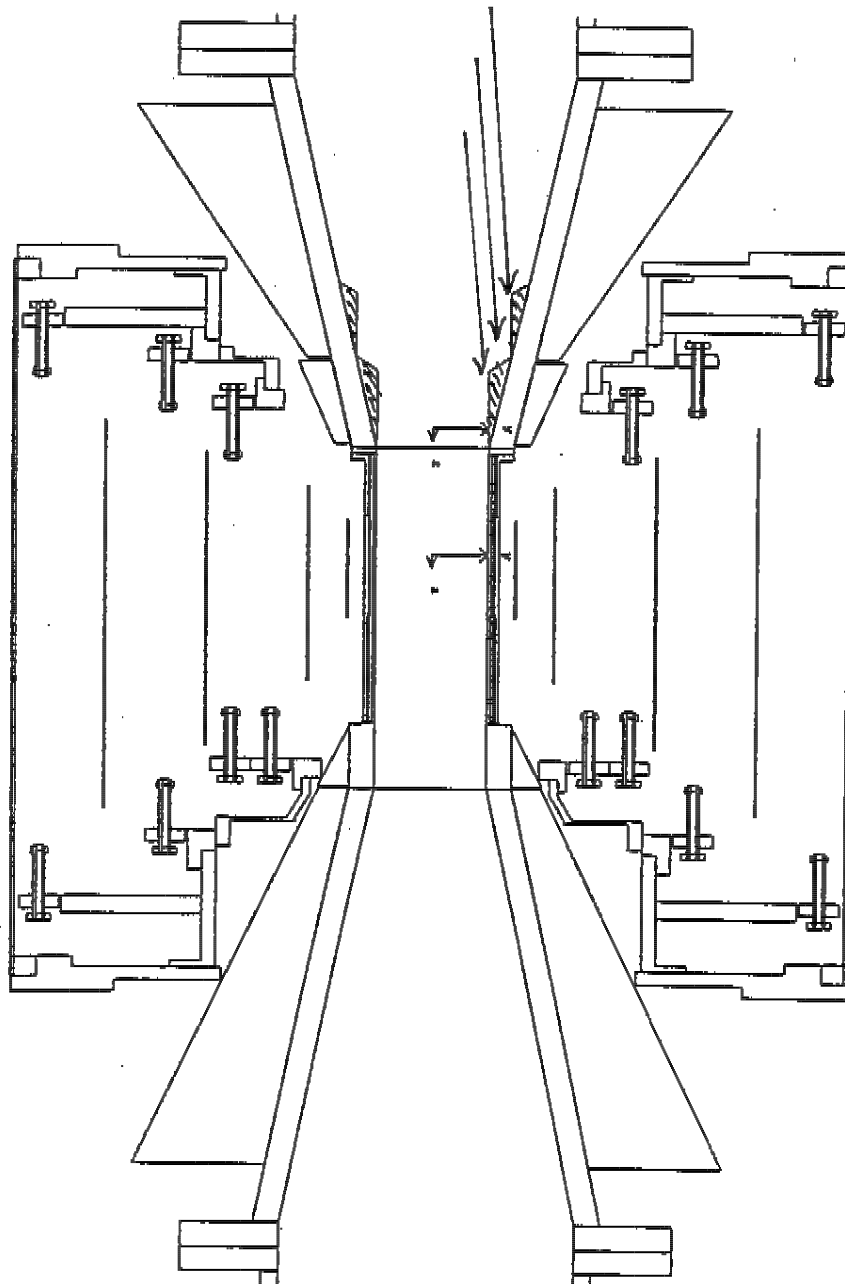
Particle Background Simulation (HER) by Karim Trabelsi

1. Bremsstrahlung on residual gas

- (a) SVD energy deposit caused by beam particles hitting near IP.
- (b) highly sensitive to the beampipe radius.

	SVD 1yr1 dose
SVD1.2 (r = 2.0 cm)	5.5 kRad/yr
SVD2.0 (r = 1.5 cm)	12 kRad/yr
SVD2.0 (r = 1.0 cm)	31 kRad/yr

- (c) Only from the upstream straight section.



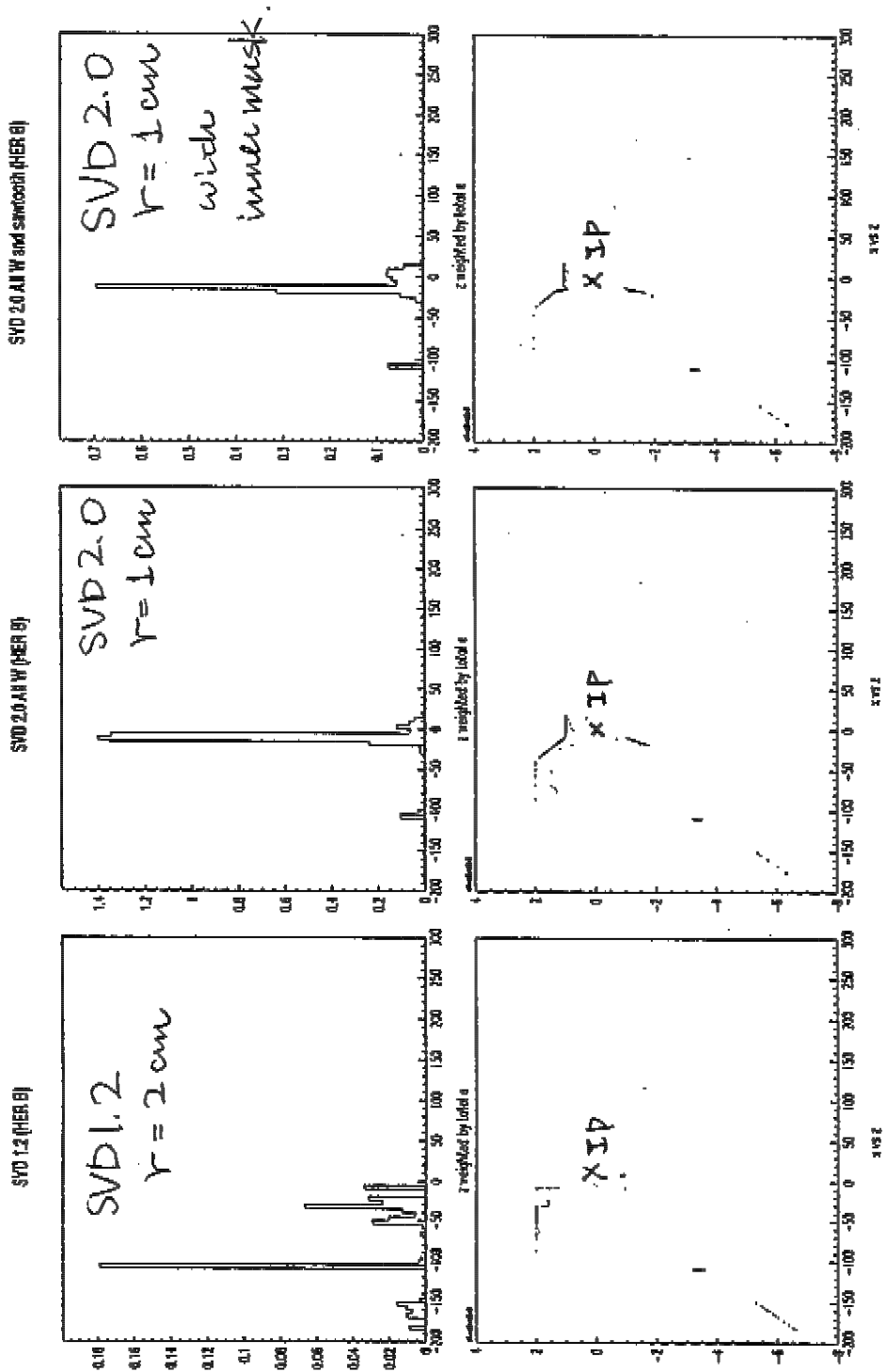


Figure 45: The upper plots show the energy deposited, in GeV, in all layers of the SVD, by 4000 HER bremsstrahlung events, as a function of z , the distance from the IP in m. The leftmost plot is for the SVD 1.2 geometry; the middle plot is for the 1.0 cm-radius SVD 2.0 geometry with the W-mask shape shown in Figs 42 and 43; the rightmost plot is for the same geometry as the middle plot, with the additional W pieces shown in Fig. 44. The lower plots show the beam-pipe hit locations of energy-depositing events.

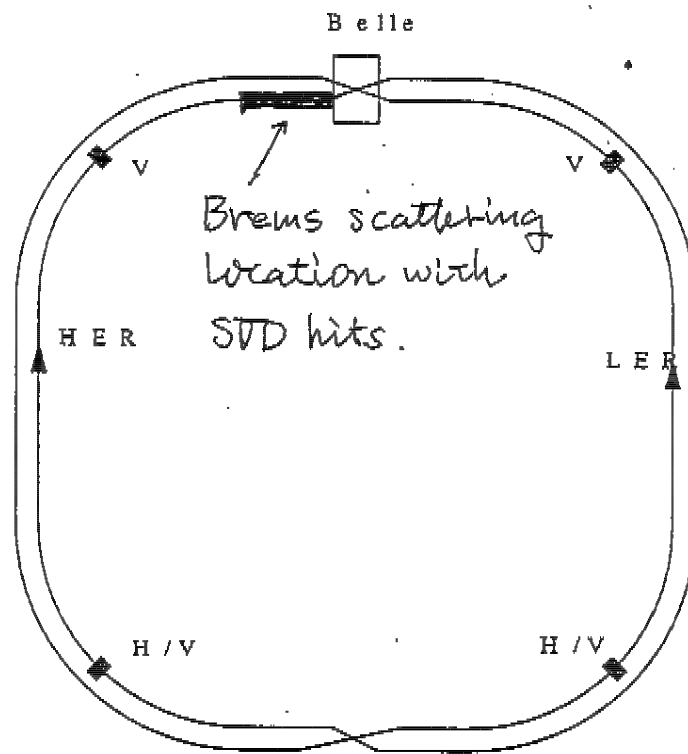


Figure 31: Location of movable masks. There were also masks near the IP, but they had little effect on background and are not shown.

2. Coulomb scatt. on residual gas

- TURTLE has been extended to the entire ring.
- GEANT has been extended to 8m from IP.
(includes QC2, QC1 regions)
- Now Coulomb dominates the total.

(a) SVD energy deposit caused by beam particle hitting around QC2 and QC1.

→ soft stuff to IR.

(b) Insensitive to the beampipe radius.

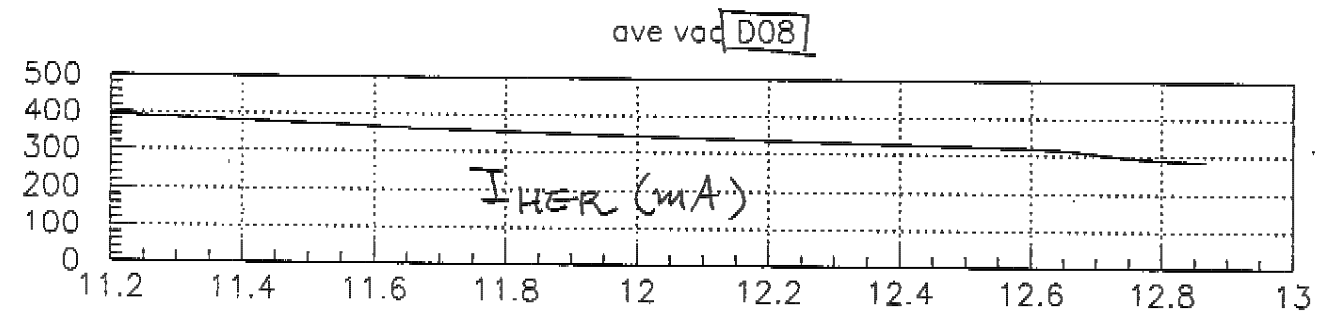
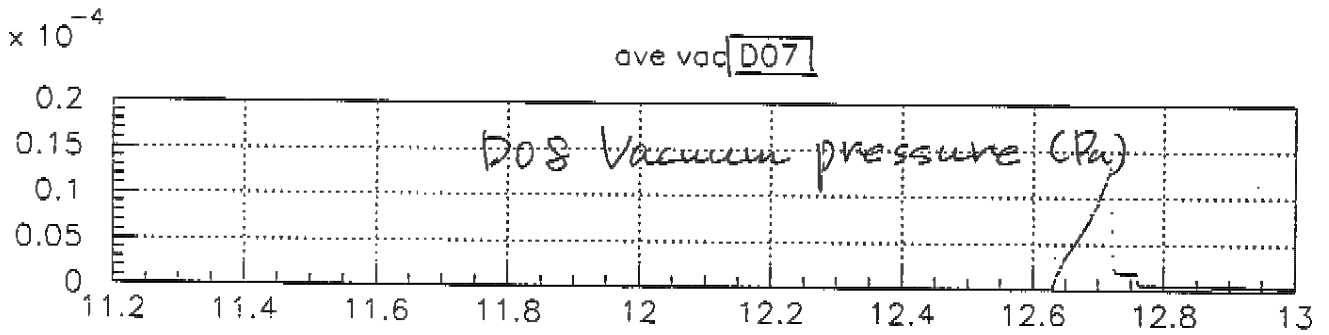
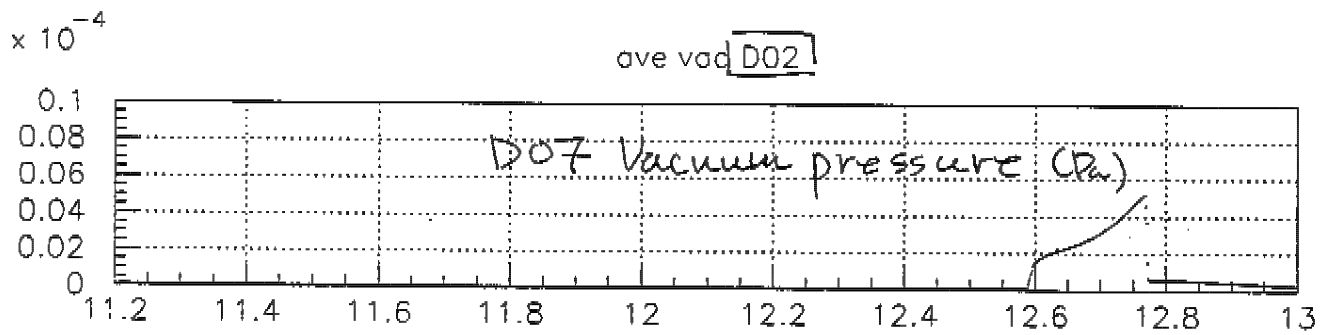
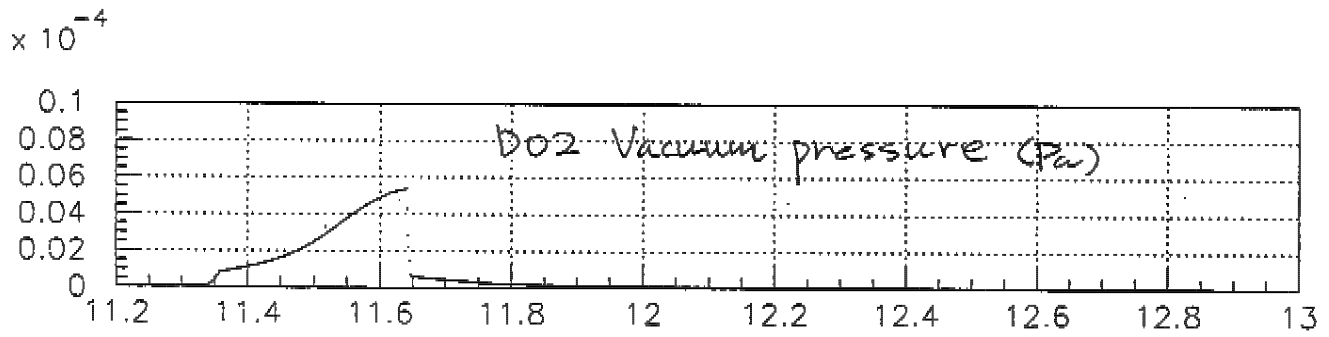
SVD 1yr 1 dose (Simulation):

SVD2.0 ($r=1\text{cm}$) with is comparable to

SVD1.2 ($r=2\text{cm}$) with current masks.

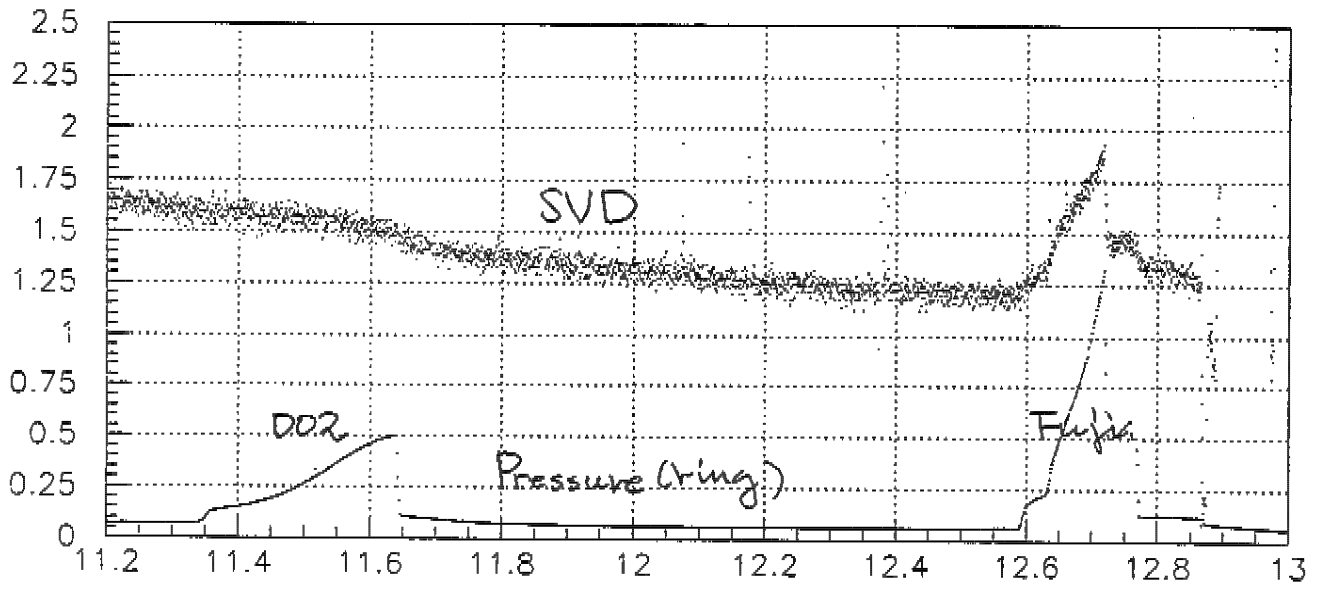
(for the same beam current and pressure)

(c) Scatterings from all around the ring contribute.

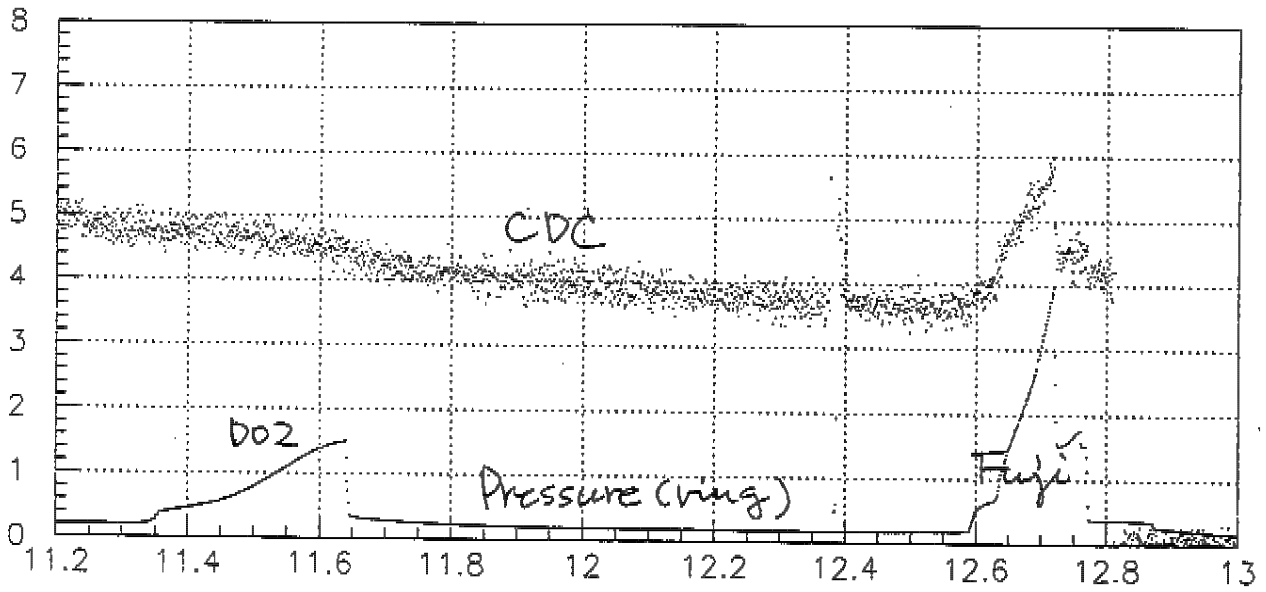


beam cur H

\rightarrow Time (hr)



svd pin0



cdc curr0

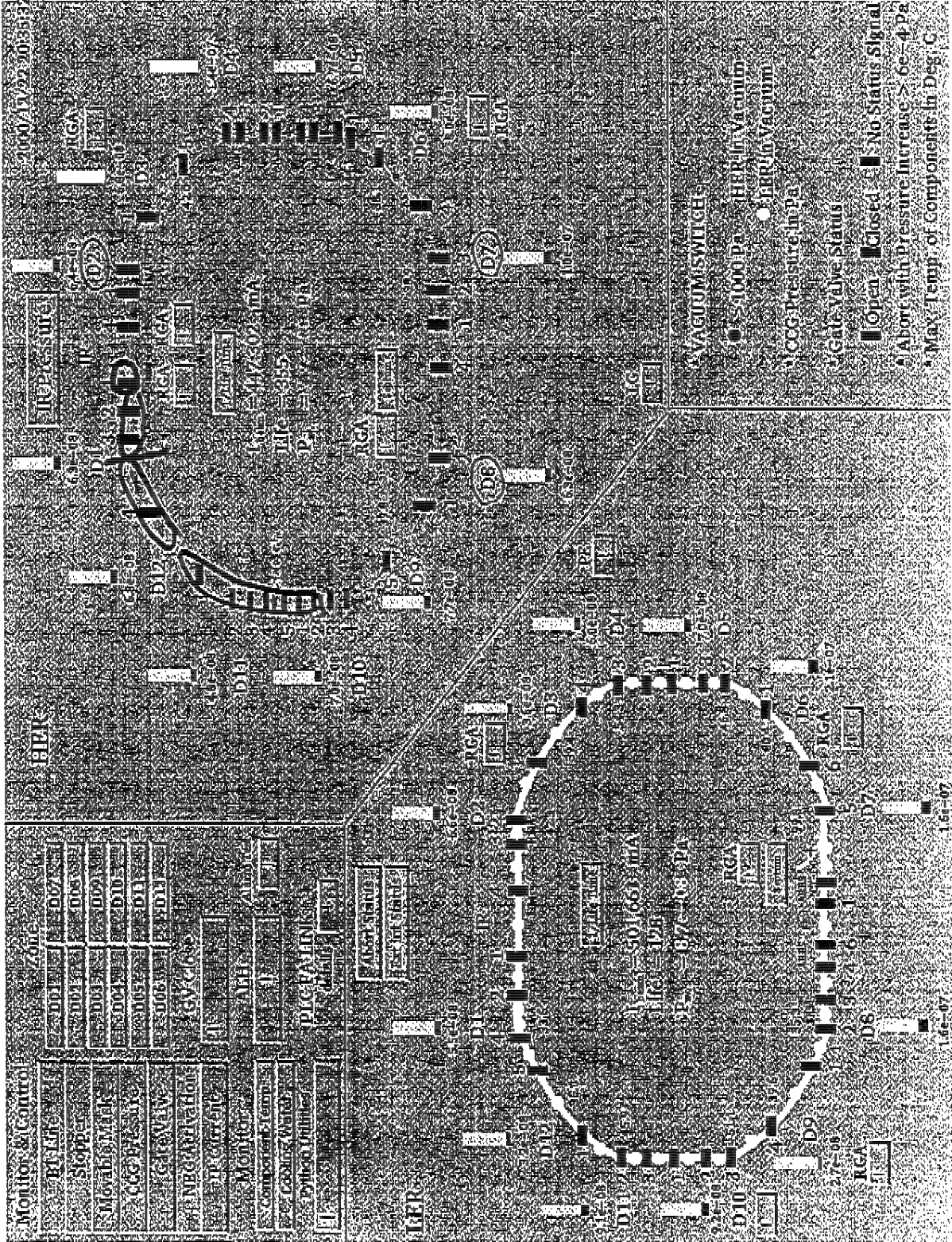
Pressure Bump Study of Dec 14

HER beam only: 370 mA to 305 mA.
(Normal fill pattern)

Two Pressure bumps:

1. D02 (just downstream of Belle)
Pressure $\rightarrow \times 135$.
The ring average pressure increased by $\times 8$,
but SVD/CDC background hardly increased
(maybe $\sim 10\%$).
2. D07,8 (Fuji)
Pressure $\rightarrow \times 100$
The ring average pressure increased by $\times 20$,
but SVD/CDC background increased only by
 $\times 1.8$.
 - The weight is not uniform around the ring.
 - Is the background dominated by Brems?
 \rightarrow dominant source is DS of the 1st bend.
 - Large Coulomb contribution from the arc and
around Nikko? (insensitive to the b.p. radius)
 - A large SR contribution?

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Proposed Pressure Bump Locations

- HER
 1. IP - GV between QC2LE and QKALE
 2. Above GV - nearest weak bend
 3. Last arc
(~~or Nikko straight section?~~)
- LER
 1. IP - nearest weak bend
 2. nearest weak bend - nearest arc
(or D03?)
 3. Nikko straight section

One hour per location → 6 hours, or 1 shift.