A Calculation on the Bypasses

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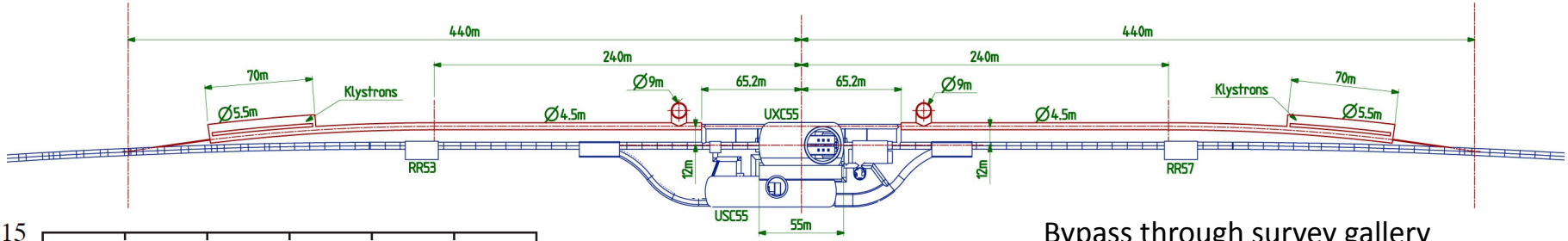
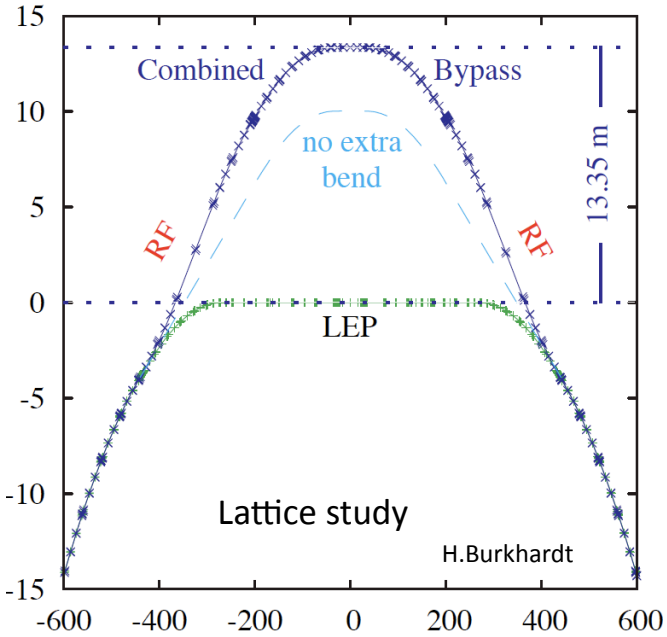
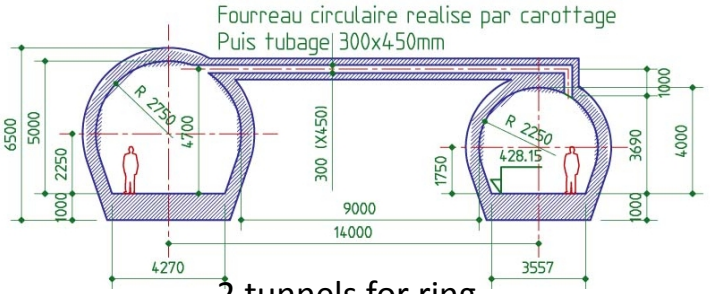


Bypass through survey gallery
13m distance, 2 shafts

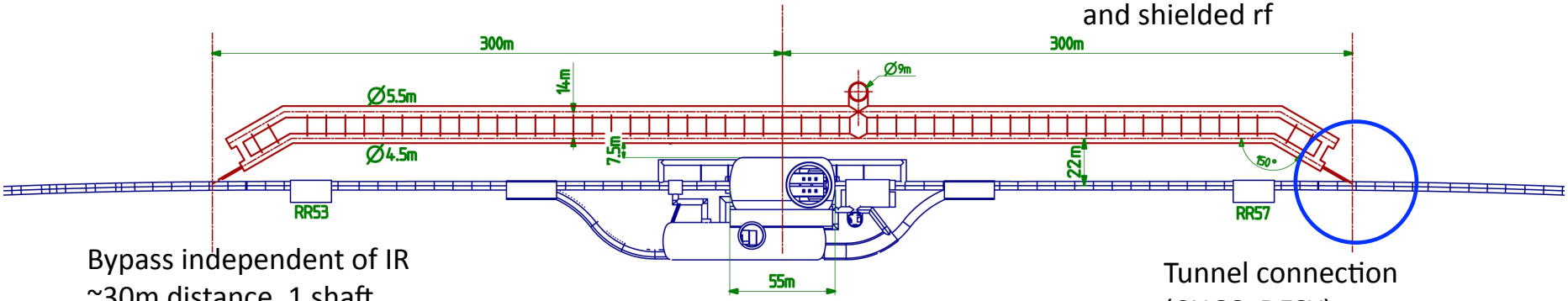


Bypass

point 5



2 tunnels for ring
and shielded rf

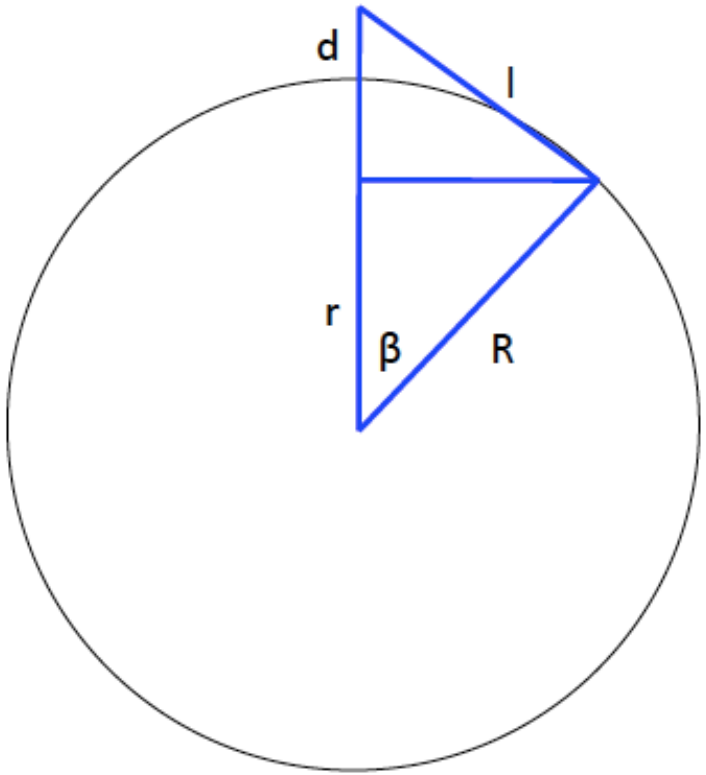


Bypass independent of IR
~30m distance, 1 shaft

Tunnel connection
(CNGS, DESY)

S.Myers, J.Osborne

R-R’ – radial adjustment of e (R’) wrt p (R)



Straight line is poor approximation of bypass..
Note l is half the bypass length

$$cos\beta = \frac{r}{R}.$$

$$R^2 - r^2 = l^2 - (R + d - r)^2$$

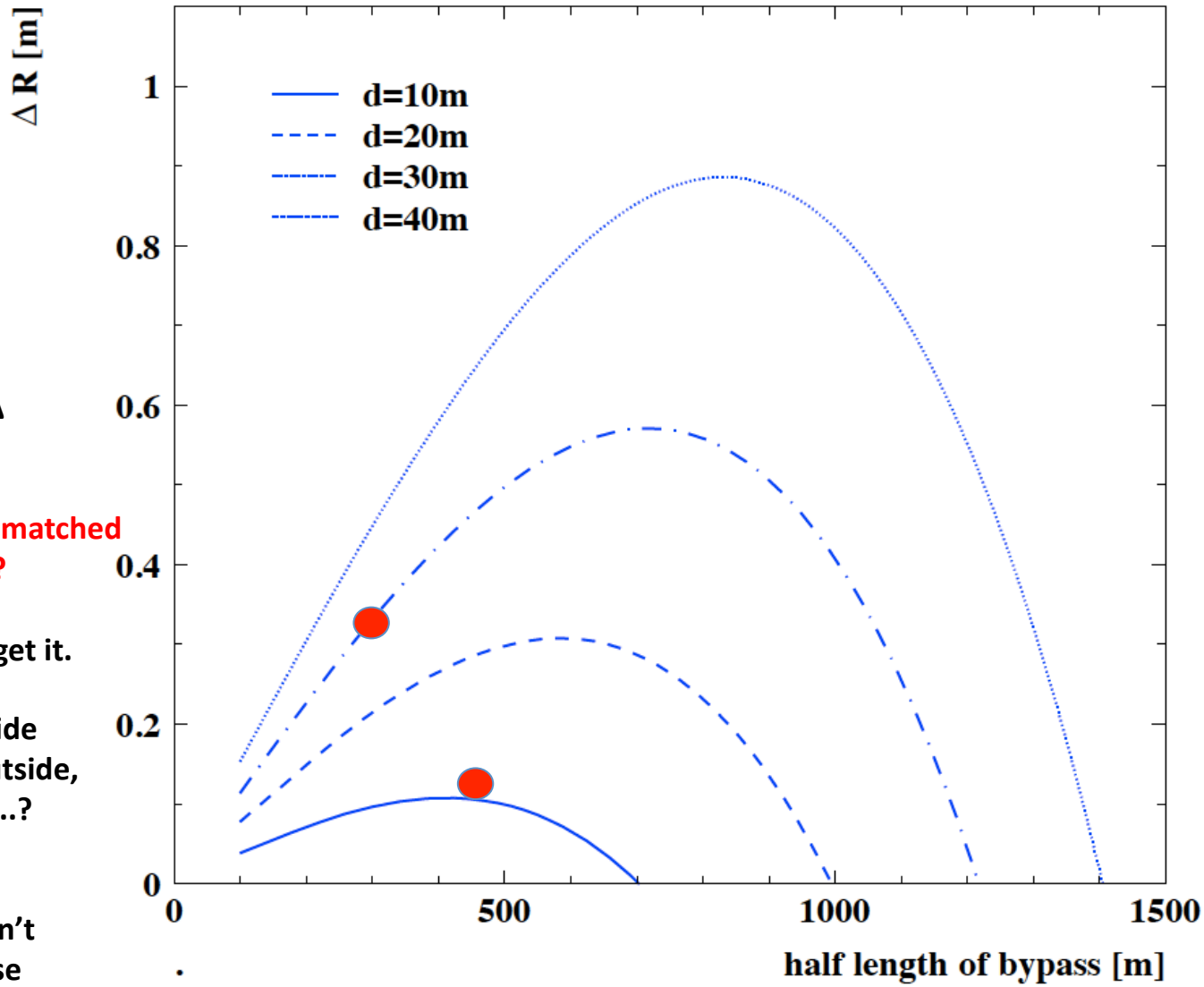
$$r = \frac{R^2 - l^2}{2R + d}$$

$$L = U' + 2l - 2u'.$$

$u' = U' \cdot \beta/2\pi = \beta R'$ and equating $L = U$

$$R' = \frac{\pi R - l}{\pi - \beta}$$

$$\Delta R = \frac{l - \beta R}{\pi - \beta}$$



Total: n_{bypass} * Δ
→0.5m .. 1m

Can U and L be matched by adjusting R'?

Karlhubert: forget it.

One bypass inside another one outside, and a third one..?

e p bunches don't match otherwise

.

← formal solution with long bypass crossing tunnel gives zero Δ..

(cf:

Nuclear Instruments and Methods in Physics Research A292 (1990) 156–168 Kohji HIRATA * and Eberhard KEIL