

Summary of gas – emittance studies

case	focus	P [atm]	Tr %	ϵ_{YN} [mm]	β_T [cm]	ϵ_{YN}^{eq} [mm]	ϵ_{YN}^{HK} [mm]	ϵ_{XN} [mm]	ϵ_{ZN} [mm]
all	tr	100	96	1.06	61	2.36	1.05	3.44	3.01
all	g	100	96	1.09	58	2.25	---	3.64	3.14
DIP only	tr	200	0*	2.21	58	2.25	2.2	50.8	9.1
RF only	tr	200	20	1.00	58	2.25	1.05	3.23	27.7

* 10% transmission at ~1/2 total turns

- I confirm Harold's results
- problem is not caused by
simple mistake
transport matrix edge focusing
using theoretical β_T instead of statistical value from beam distribution
coupling of vertical emittance into other dimensions
- looked for evidence of higher order correlations in the beam distributions that could make emittance calculation incorrect
couldn't find any
- looked for problems with scattering in an RF cavity (L= 25 cm, P = 100 atm)

field	G [MV/m]	ϕ [deg]	θ_{MS} [mr]
NONE	---	---	3.316
ACCEL	0	0	3.316
	10	0	3.474
	20	0	3.584
	30	0	3.403
	30	90	3.293
	30	180	3.400

=> nothing obviously wrong with scattering in an RF field

this is still a mystery!!!