

Reducing the RF Voltage Requirement by Blowing up the Initial Emittance

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1.
Experience with protons
showed that increasing the initial
 ϵ_x from $\epsilon_x = 10$ to $\epsilon_x = 20$
reduced RF voltage required
by about 60%.

H. Hahn suggestion to try
increasing ϵ_x for Au at $\delta = 100$
to reduce V_{RF} required.

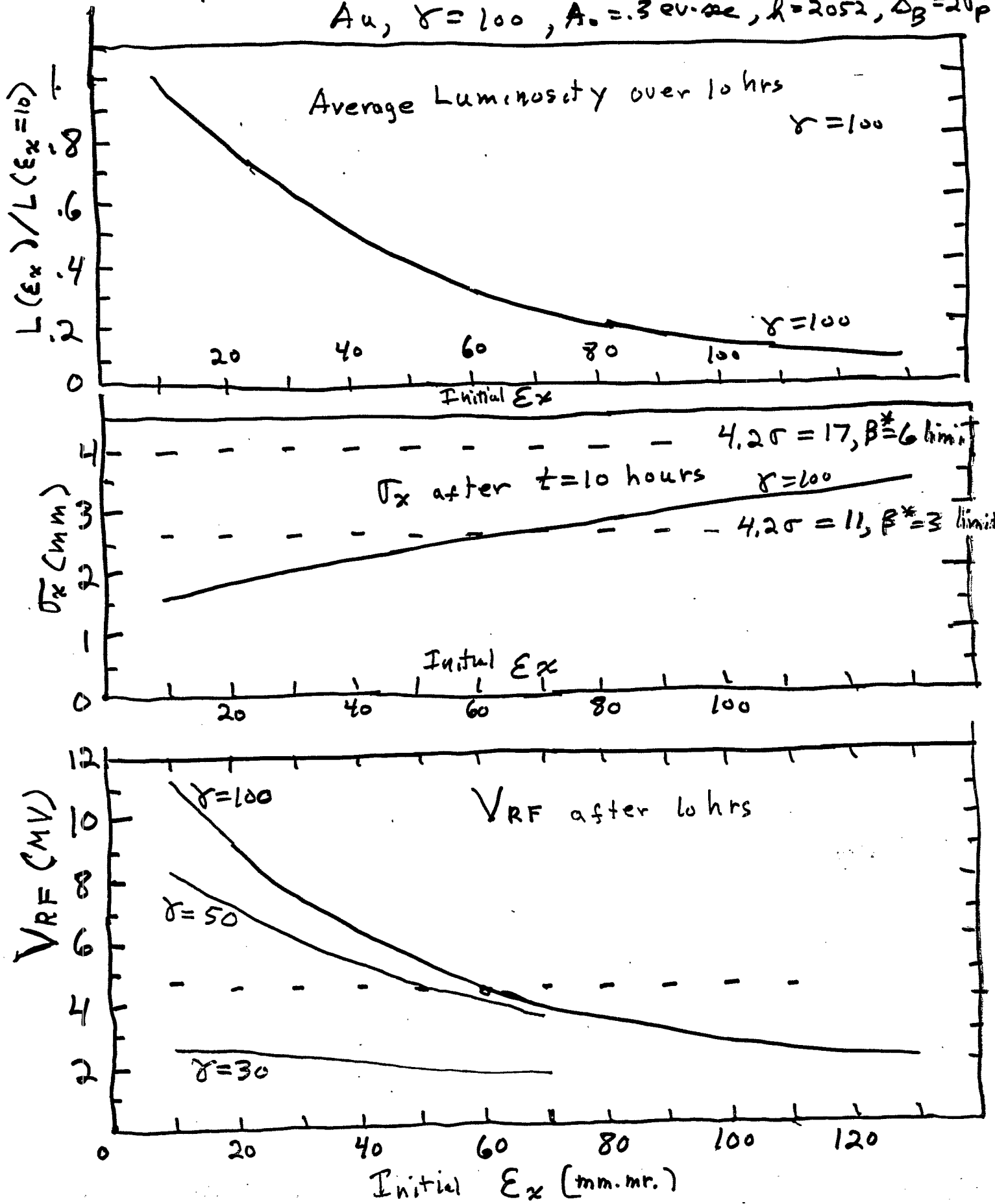
Theoretical Basis — (Valid at high δ)

1) Phase space density indicates that
 σ_p growth rate, due to intrabeam scattering,
decreases like $1/\sigma_x^4 \sim 1/\epsilon_x^2$

2) Partition ~~the~~ Rule, $\sigma_E \simeq \sqrt{2} \sigma_x$
indicates that σ_p growth rate
increases like $(\sigma_x/\sigma_E)^2$

Phase space density factor should (~~dominate~~)
dominate and σ_p growth should decrease.
when ϵ_x is increased.

Dependence on Initial E_x ; V_{RF} , σ_x , L after 10 hours
 A_u , $\gamma = 100$, $A_0 = .3 \text{ ev.}$, $h = 2052$, $\Delta_B = 2\sigma_p$



γ dependence of initial ϵ_x , σ_x , Lum.

