STUDY 2B FRONT END: ERRORS

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Outline of the Talk

- Transmission with failure of a single cavity

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- Transmission with failure of a single cavity
- Transmission with lower gradient in the cooling section

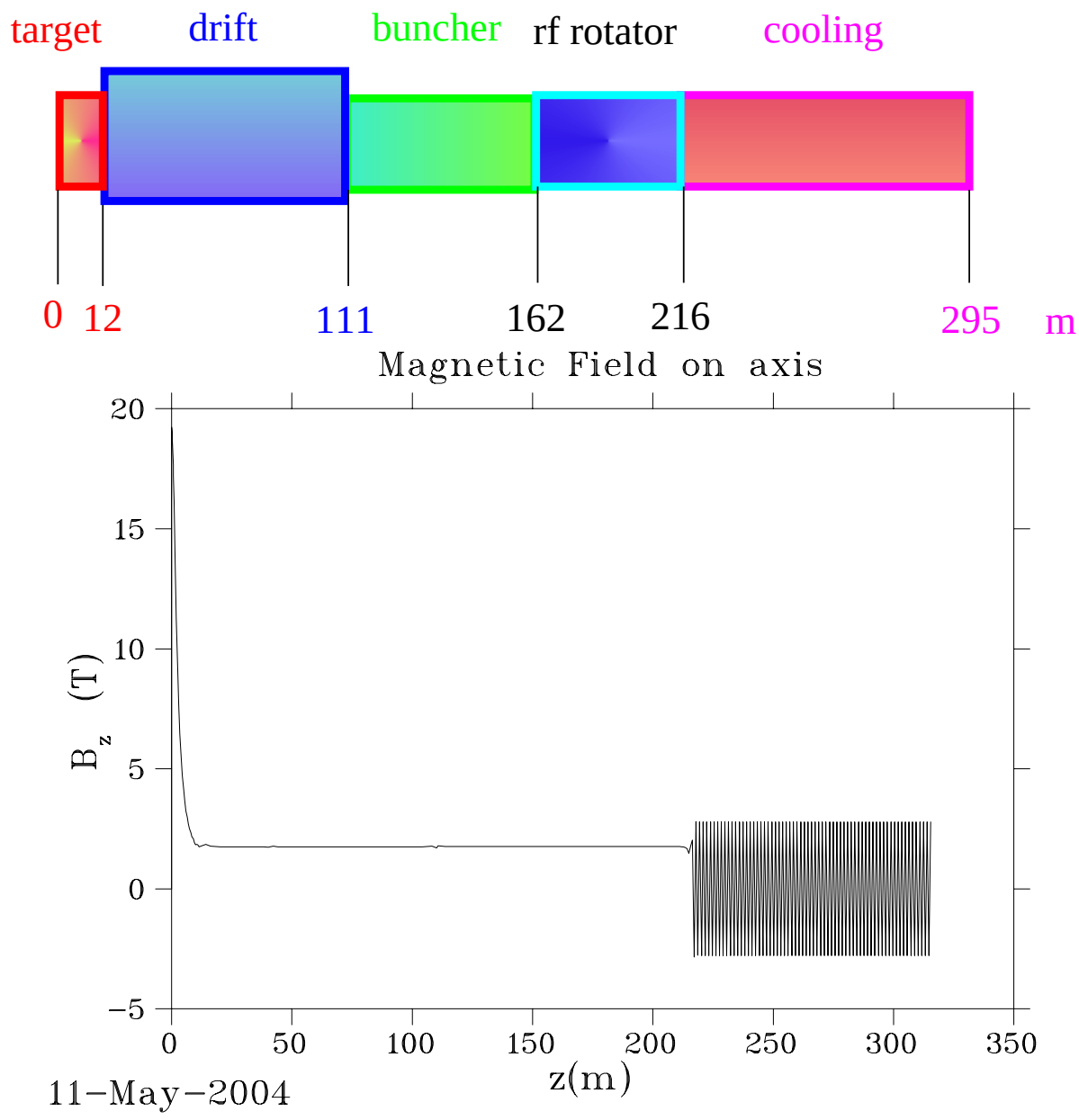
General Motivation

Study of errors and deleterious effects to the performance.

Scott asked: what if the power source fail?

Bob asked: Is it possible to reduce the gradient in the cooling section $15.25 \Longrightarrow 12.25?$ MV/m.

Layout of Front End



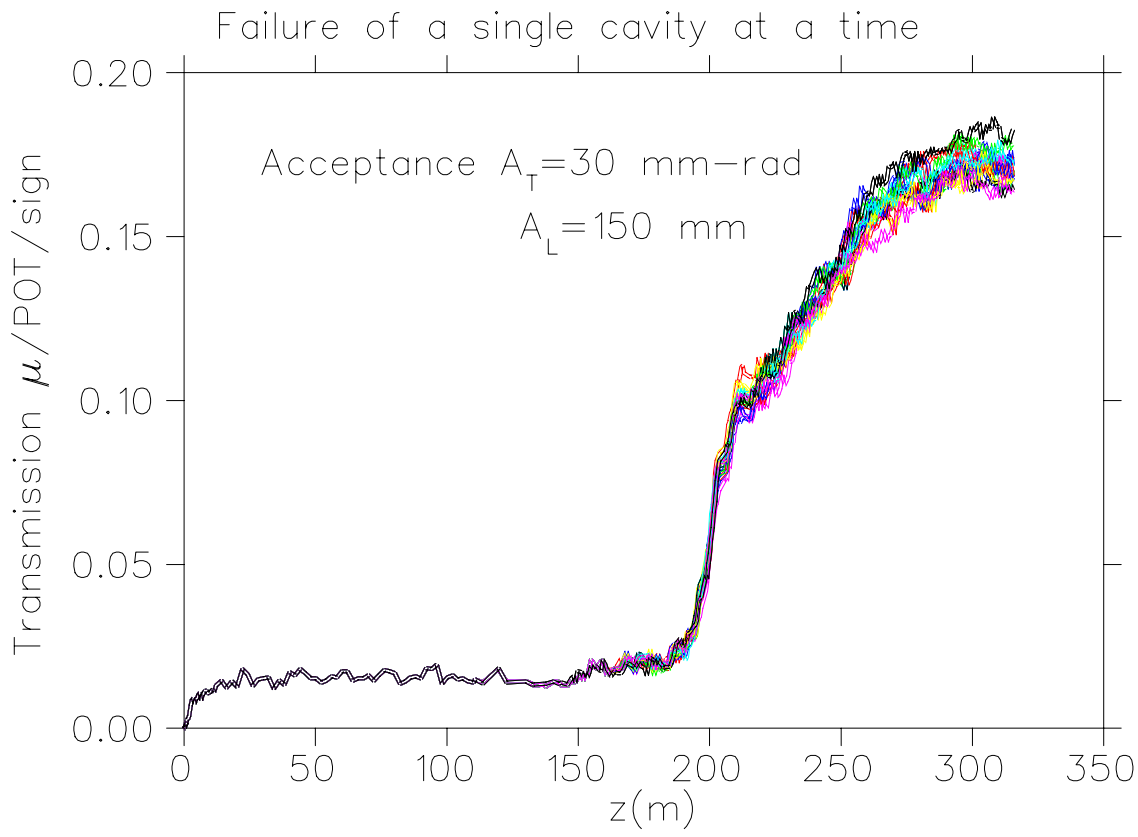
Capture/Drift/Buncher Sections

- Capture Section: Hg jet target; AGS type proton beam. Length≈ 12m
  $20 < B_z < 1.75$ T
- Decay Drift: Length≈ 100 m $B_z = 1.75$ T
- Adiabatic Bunching: 27 cavities with 13 different $\Downarrow$ frequencies and changing $\Uparrow$ gradients. Length ≈ 50 m
  - $333 \leq f \leq 234$ MHz
    $5 \leq Grad. \leq 10$ MV/m

Phase Rotator/Cooling Sections

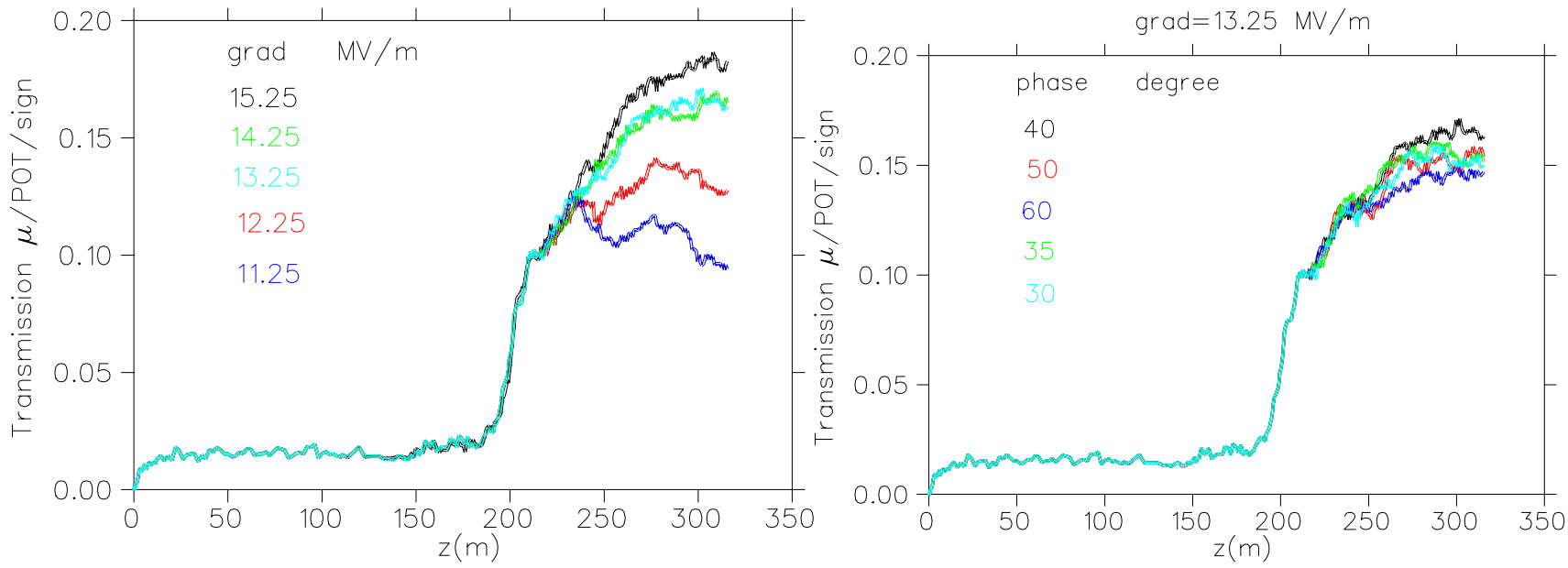
- Phase Rotator: 72 cavities with 15 different $\Downarrow$ frequencies; constant gradient. Length ≈ 50 m
  - $232 \leq f \leq 201$ MHz
    $Grad = 12.5$ MV/m
- Cooling Section: 129 cavities with constant frequency and gradient. Length ≈ 80 m
  - $f = 201$ MHz $\qquad Grad = 15.25$ MV/m

Failure of a single rf cavity



Failed cavity in rotator or cooling section. Reduction: 3%

Gradient in the cooling section



(Left) Transmission for different gradients. (Right) Transmission for $grad = 13.25\ MV/m$ and different phases.