

# **Status of Heavy Ion Driver Point Design**

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PPPL**

# Work continues on defining a self-consistent HI power plant design

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- Since last ARIES meeting, a different approach to pulse-shaping has been adopted as baseline. It requires building pulse from groups of beams with different pulse widths.
- Reference ion is now Bi (209 amu) instead of Xe (131 amu) assumed in recent previous examples
  - Better focusing capability
  - Higher driver cost
- Now referred to as the Robust Point Design (RPD) to indicate further optimization is possible.

## Some key parameters

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Ion = bismuth ( $A = 209$  amu)

Total beams = 120

48 foot pulse beams at 3.3 GeV

72 main pulse beams at 4.0 GeV

Total beam energy  $\sim 6.6$  MJ (awaits 2D target calculations)

1.8 MJ foot beams

4.8 MJ main pulse beams

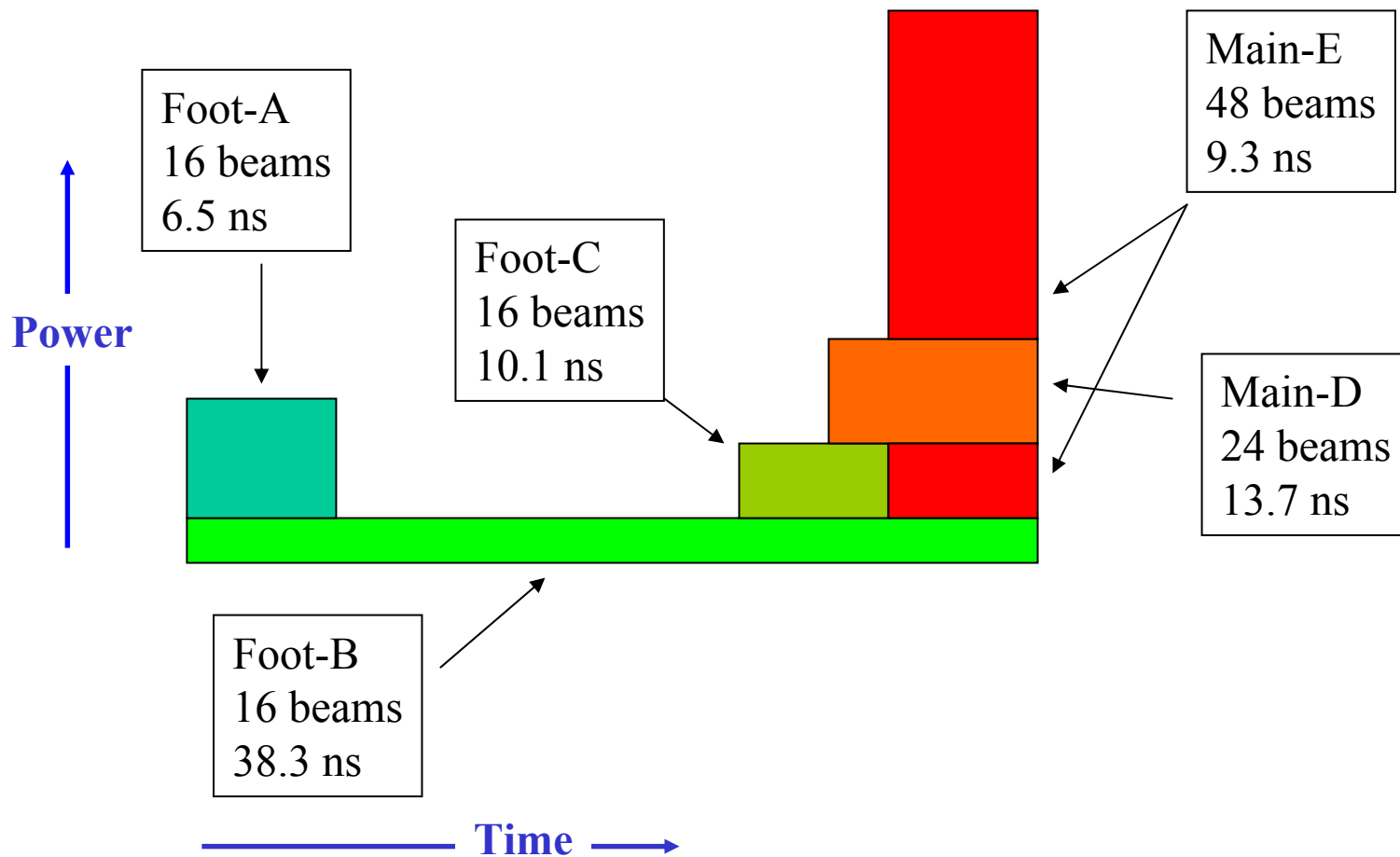
Beam focus half angle = 10 mrad

Spot size  $\sim 2$  mm at focal length = 6 m

Meets requirements of distributed radiator target

# Illustration of pulse shape – beam power vs. time

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# Summary

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- Appears to be agreement on current choice of baseline parameters for RPD driver, chamber, target.
- This point will serve basis for more detailed design work and analyses (magnet packing, focusing, shielding, costing, etc.)
- Several papers planned for ANS Technology of Fusion Energy meeting in November

# Future work

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- HIF VNL and VLT funded work will continue on all aspects of HIF
- ARIES participants can contribute to continued design optimization processes
- LLNL will continue work on
  - Driver and power plant systems code improvements and systems analyses
  - Final focus magnet shielding coupled with VNL magnet design and layout and chamber fluid configuration (details in Latkowski talk)
  - Chamber and magnet mechanical design (nozzles, first wall, magnet support (with PPPL), materials issues)
  - Target design (VNL funded)