Nozzle Motion/Phasing Over Reactor Lifetime (AI#4)

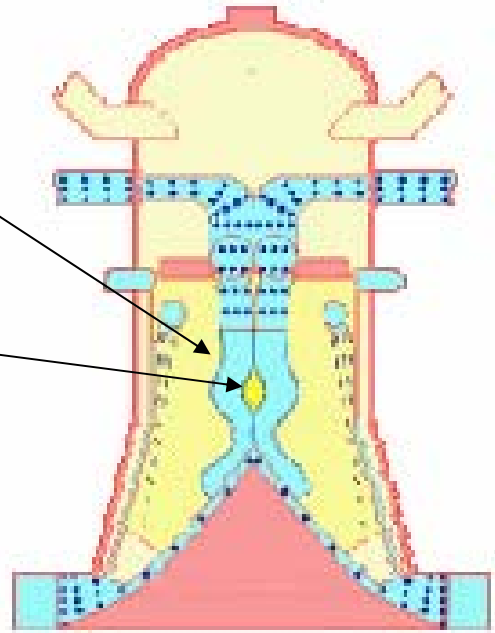
L. Waganer and W. Meier

6 May 2003

ARIES Meeting at Livermore

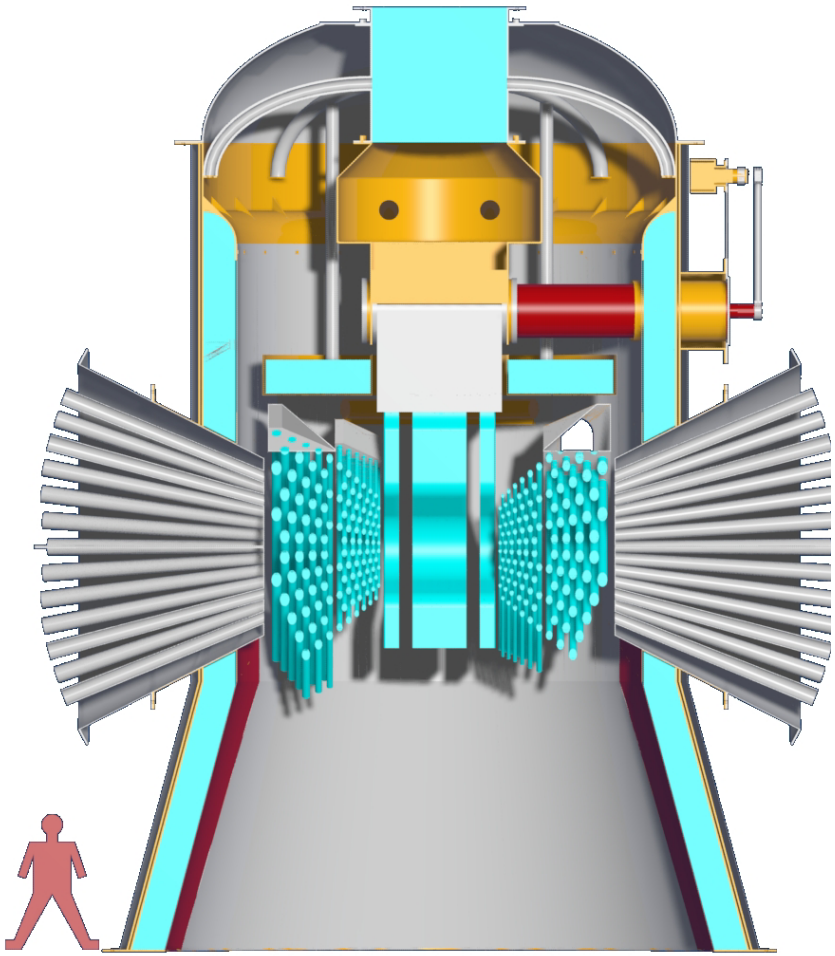
HYLIFE-II Is the Basis for Assessment

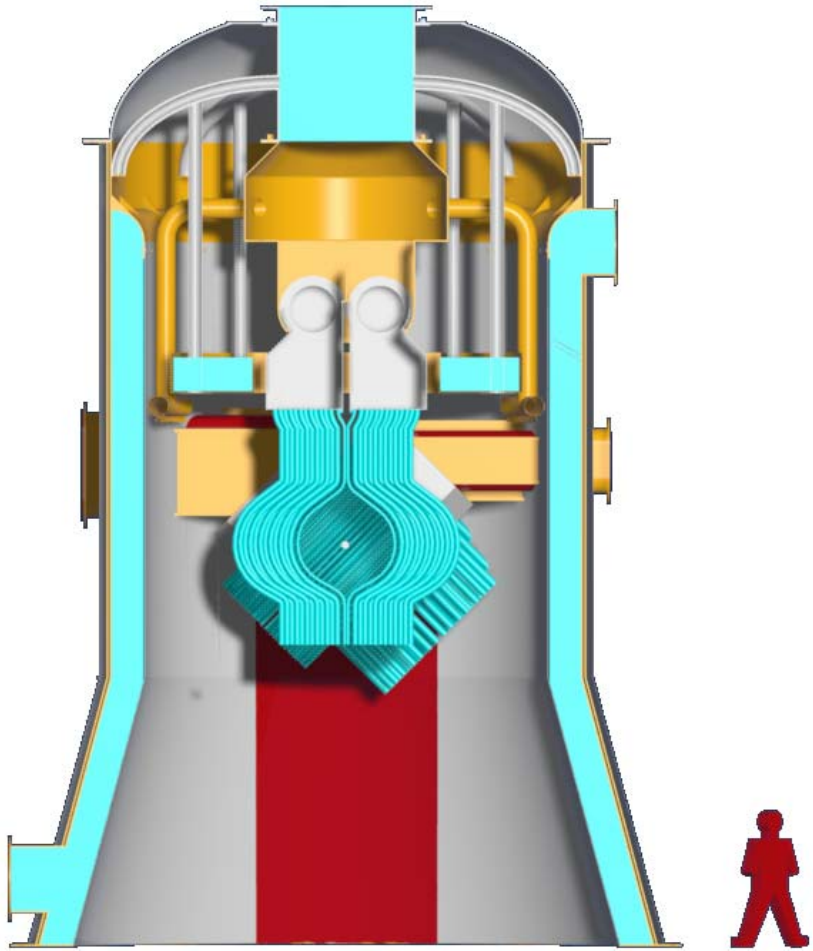
- Opposing Oscillating Nozzles Establish Pocket of Liquid
- Target Is Positioned in Center of Pockets when HI Beams Arrive
- Question: How Can Nozzle Motion and Phasing be Maintained over Reactor Lifetime?



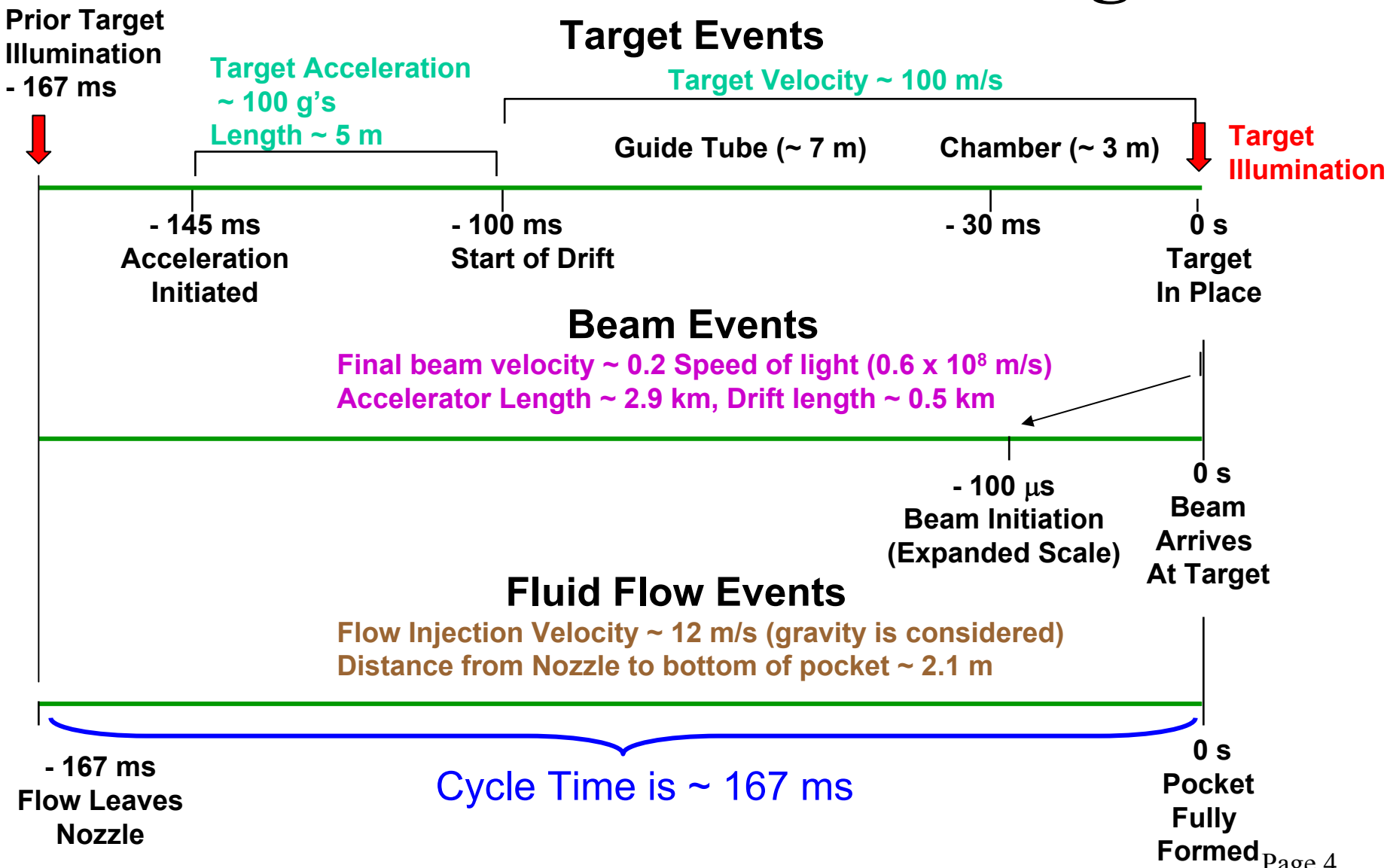
HYLIFE-II

Cross-sectional Views of HYLIFE-II Chamber





Review of Event Timing



Sequence of Events

- Pocket Formation Will Establish Timing for Target Acceleration Initiation
- Central Liquid Pocket Is Very Large (~1 m dia) Compared to Placement Requirement for Target (~mm's)
  - Target Launch Timing Is Not Critical With Respect To Pocket
- Beam Initiation Will Be Determined by Expected Target Position in Chamber
  - Likely Inferred from Exo-Chamber Position and Velocity Data
  - Fluid Flow is ~ 1.2 mm from Final Position
  - Target is ~ 10 mm from Final Position

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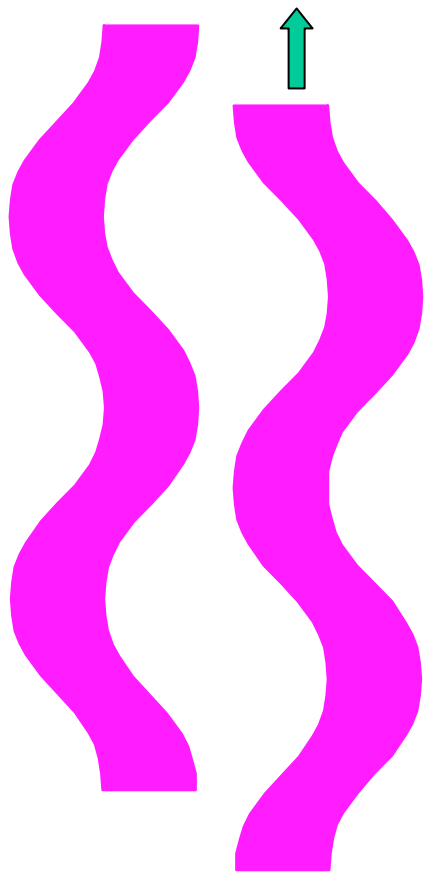

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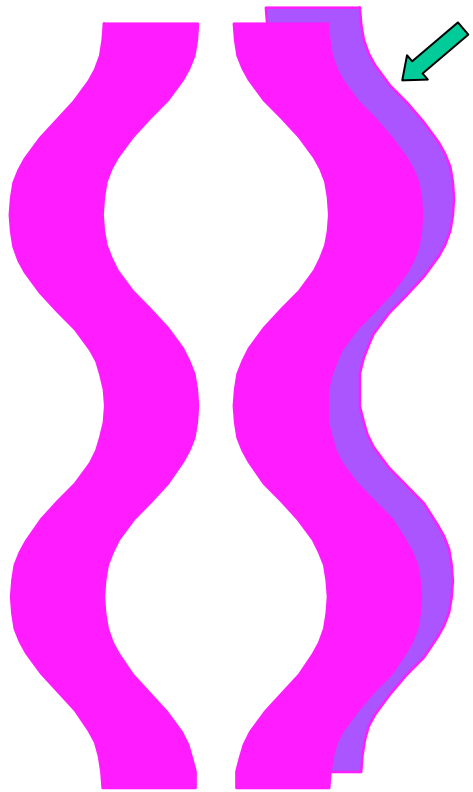

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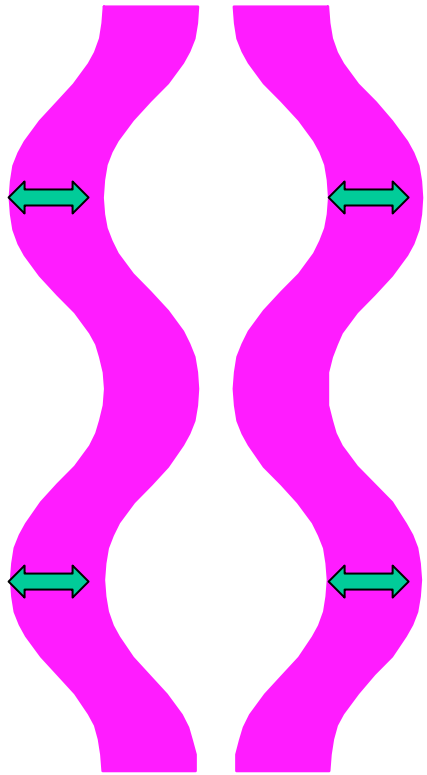

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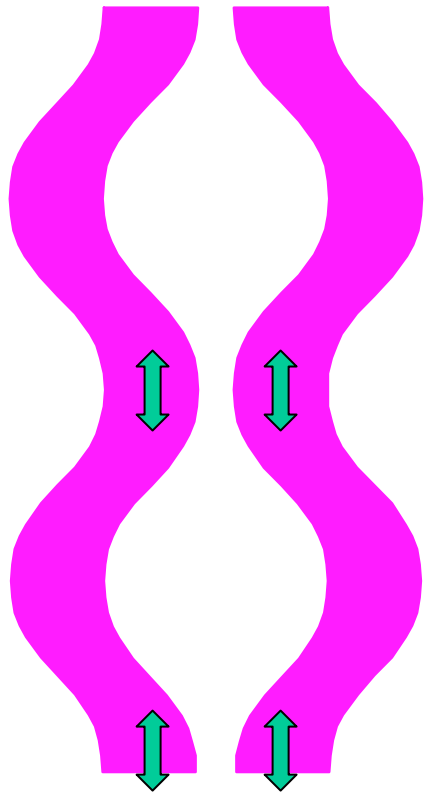

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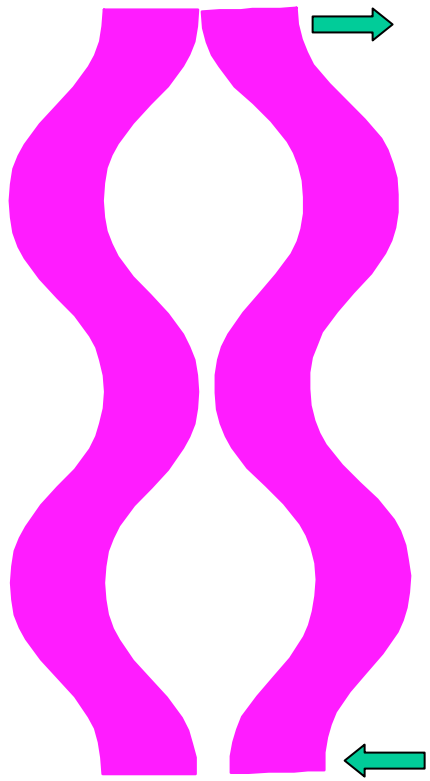

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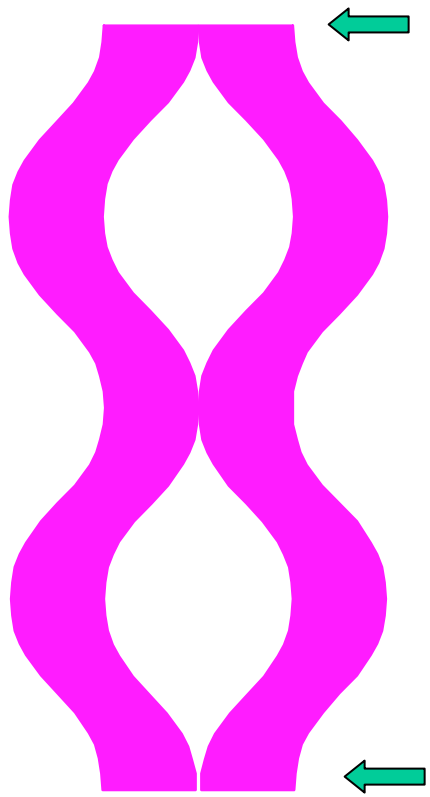
  - **Nozzles Will Be Tilted to Equalize Top and Bottom Lateral Movement on Centerline**
  - **Nozzle Minimum Movement Will Be Adjusted to Establish Pocket Closure (Both Top and Bottom)**



System Timing Variables Affecting Target Performance

- **Flow Velocity**
  - **Monitor and Adjust Pump Performance to Specification**
- **Target Timing Relative to Nozzle Position**
  - **Electronically Adjust Timing to Specification Periodically (not required shot-to-shot)**
- **Beam Timing Relative to Target Position**
  - **Electronically Adjust Timing to Specification**

Summary

Nozzle, Pump, Target Injector, and Beam Subsystems Will Be Designed To Be Adjustable to Correct for Any Degraded Performance Levels

- Tracking the target and timing and pointing beams is the primary challenge

-Timing target injection with liquid pocket formation will likely only require periodic adjustment

- **Pocket volume is so much larger than target placement requirement**
- **Variations in oscillating nozzles due to wear will occur over long time scales**