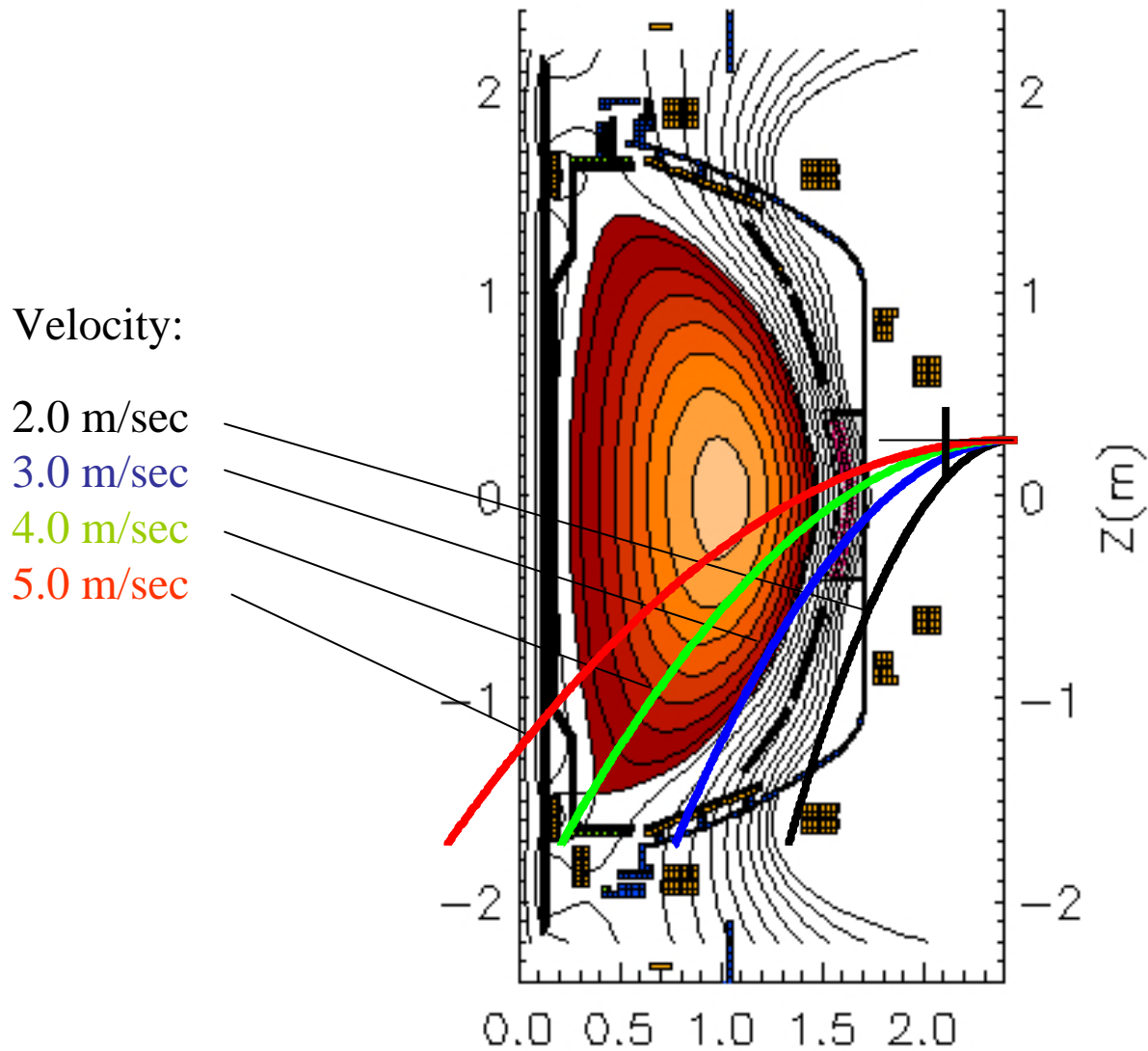


What do we know at present about lithium and NSTX ?

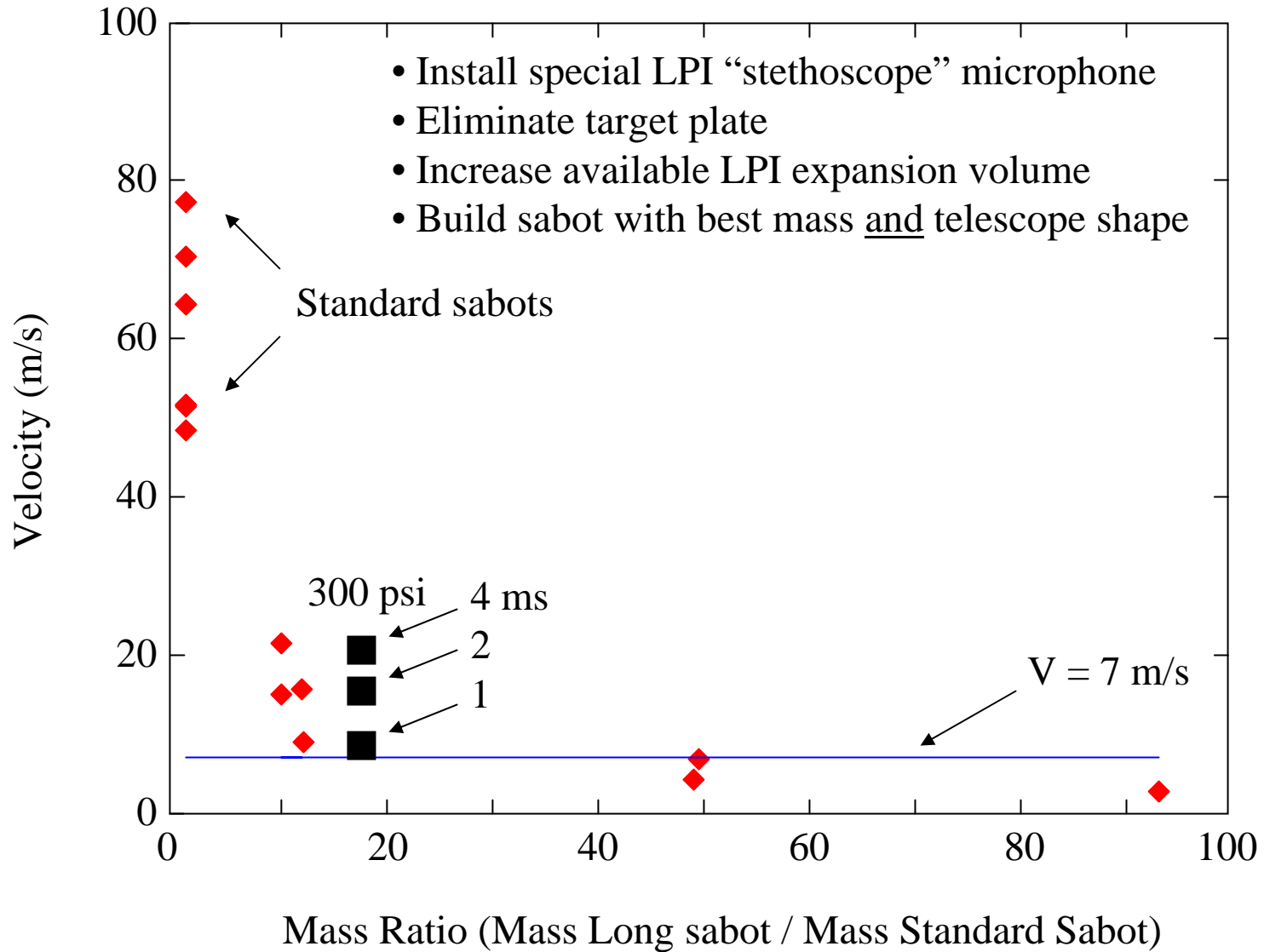
- About 10 – 30 mg of Li put down by pellets injected into Ohmic discharges before the shot of interest reduces the density - at least transiently - during the next discharge.
- The density reduction introduced in this manner (pellets) is completely gone after only one discharge. Hence at least 10 – 30 mg of Li is “passivated” during the shot of interest.
- Macroscopic amounts of Li introduced by LITER between discharges and during HGDC has beneficial effects on plasma performance but does not reduce the density.
- The amount of Li introduced during the shot of interest by LITER is equivalent 0.1 – 1 pellet, which is less than is being “passivated” during the same shot (3 – 10 pellets).
- The plasma cannot tolerate the “insult” of pellet injection (3mg @ 120 m/s) during the shot of interest.

NSTX Trajectories from LPI

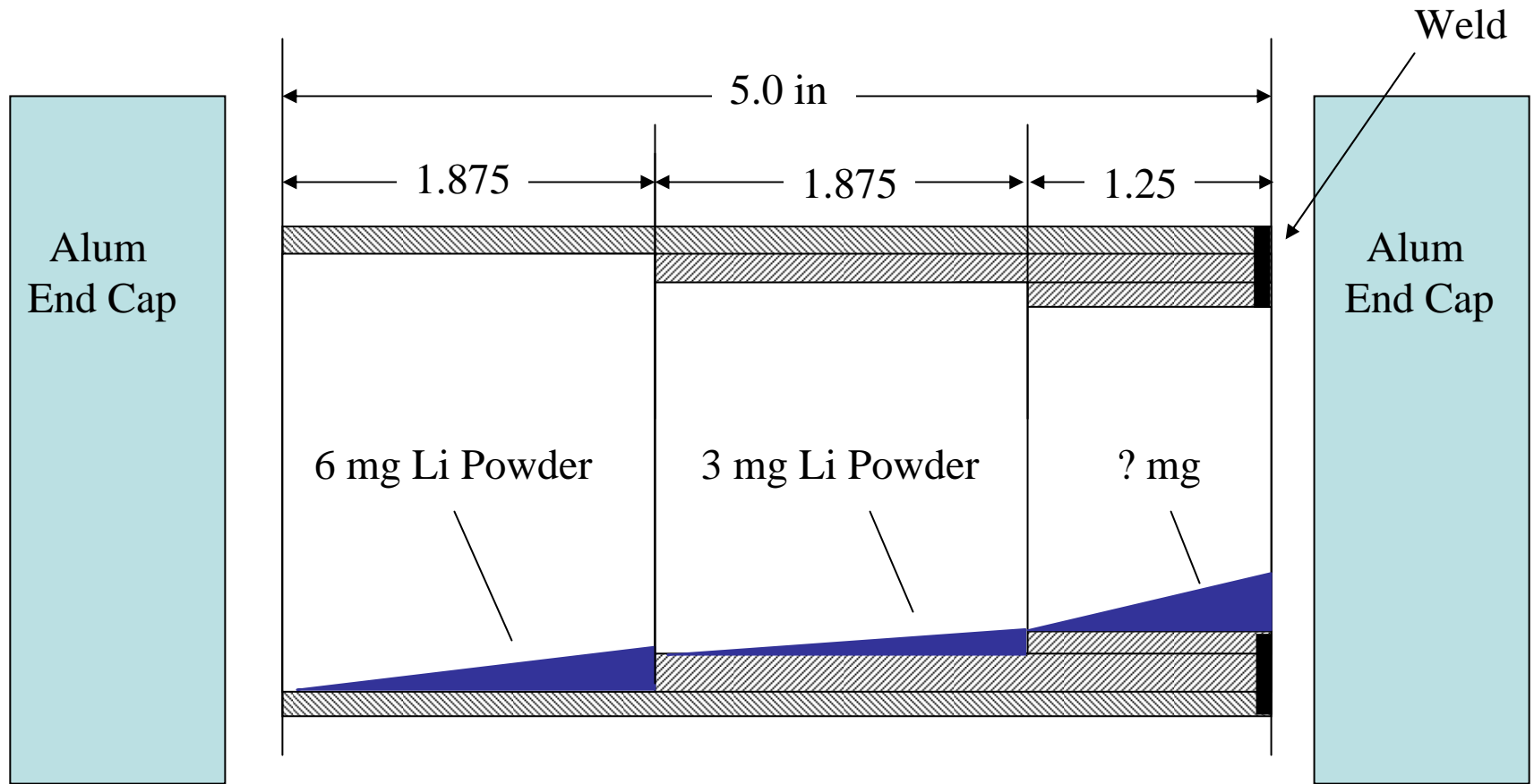
from \EFIT02, Shot 120001, time=399ms



Determination of “Best” Sabot Design



Telescope Steps Help Prevent Bunching and Add Correct Amount of Mass to Slow Sabots to ~ 10 m/s (Mass = 1.7 gm)



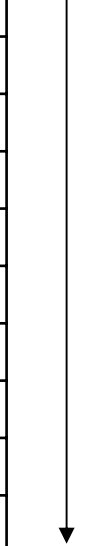
Shot Sequence

Shot No.	Nom. Mass Injected (mg)	Oven Btwn Shot (mg)	# Barrels Employed	Arrival Time (secs)	Sum Lithium Mass (mg)
1	0	0	-	-	0
2	0	0	-	-	0
3	5	0	1	0.2	5
4	5	0	1	0.2	10
5	10	0	1	0.2	5
6	10	0	1	0.2	10
7	20	0	2	0.2, 0.4	50
8	20	0	2	0.2, 0.4	70
9	30	0	3	0.2, 0.4, 0.6	100
10	30	0	3	0.2, 0.4, 0.6	130
11	0	150	-	-	380
12	0	150	-	-	530
13	5	150	1	0.2	685
14	5	150	1	0.2	840
15	10	150	1	0.2	1000
16	10	150	1	0.2	1160
17	20	150	2	0.2, 0.4	1330
18	20	150	2	0.2, 0.4	1500
19	30	150	3	0.2, 0.4, 0.6	1680
20	30	150	3	0.2, 0.4, 0.6	1860

Start LITER
to ~ 450 C
~ 1 hr, No Li



LITER:
15 mg / min

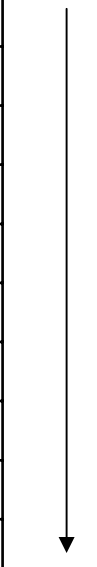


Shot No.	Nom. Mass Injected (mg)	Oven Btwn Shot (mg)	# Barrels Employed	Arrival Time (secs)	Sum Lithium Mass (mg)
1	0	0	-	-	0
2	0	0	-	-	0
3	5	0	1	0.2	5
4	5	0	1	0.2	10
5	10	0	1	0.2	20
6	10	0	1	0.2	30
7	20	0	1	0.2	50
8	20	0	1	0.2	70
9	30	0	1	0.2	100
10	30	0	1	0.2	130
11	0	150	-	-	380
12	0	150	-	-	530
13	5	150	1	0.2	685
14	5	150	1	0.2	840
15	10	150	1	0.2	1000
16	10	150	1	0.2	1160
17	20	150	1	0.2	1330
18	20	150	1	0.2	1500
19	30	150	1	0.2	1680
20	30	150	1	0.2	1860

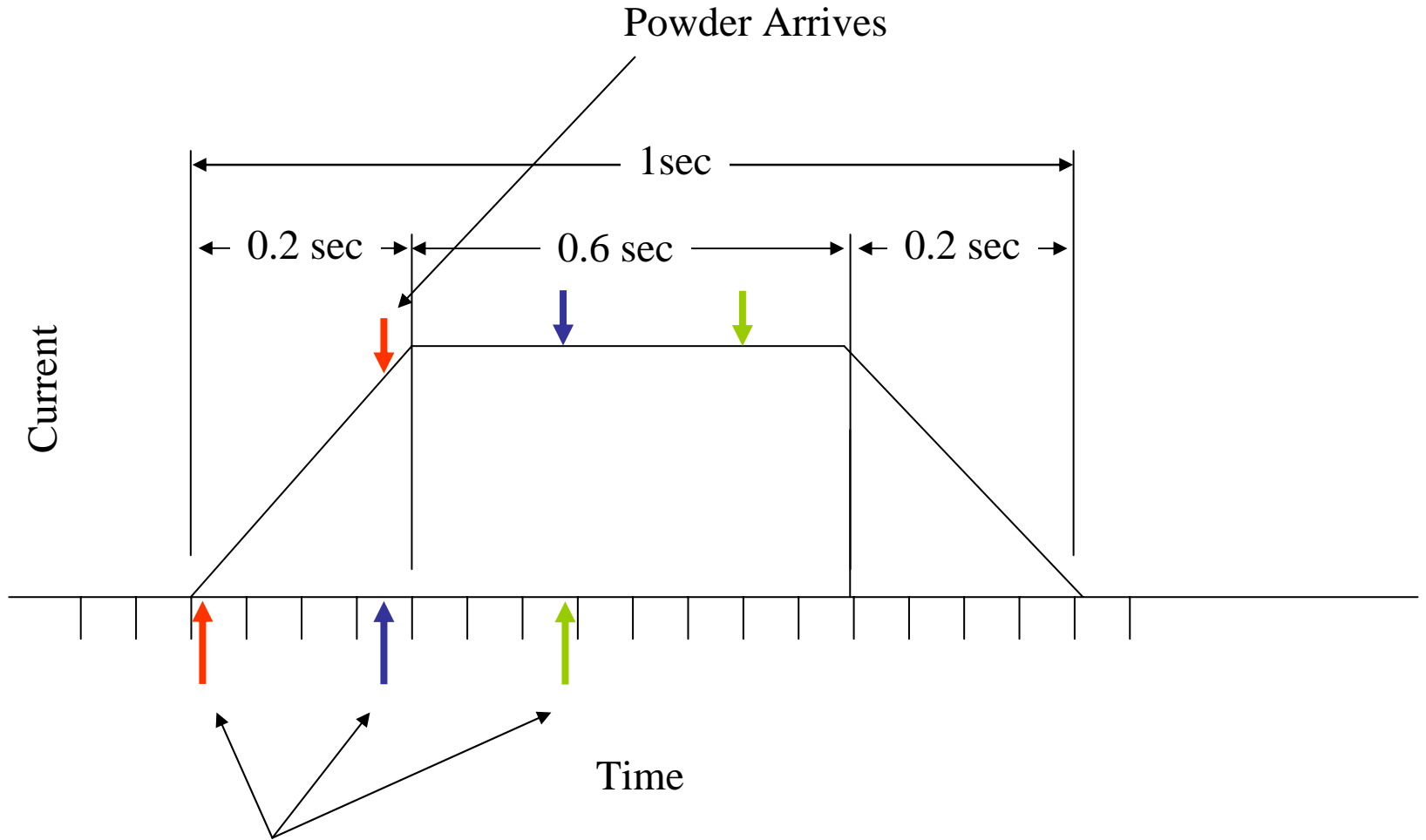
Start LITER
to ~ 450 C
~ 1 hr, No Li



LITER:
15 mg / min



Powder Timing :Shot 123848



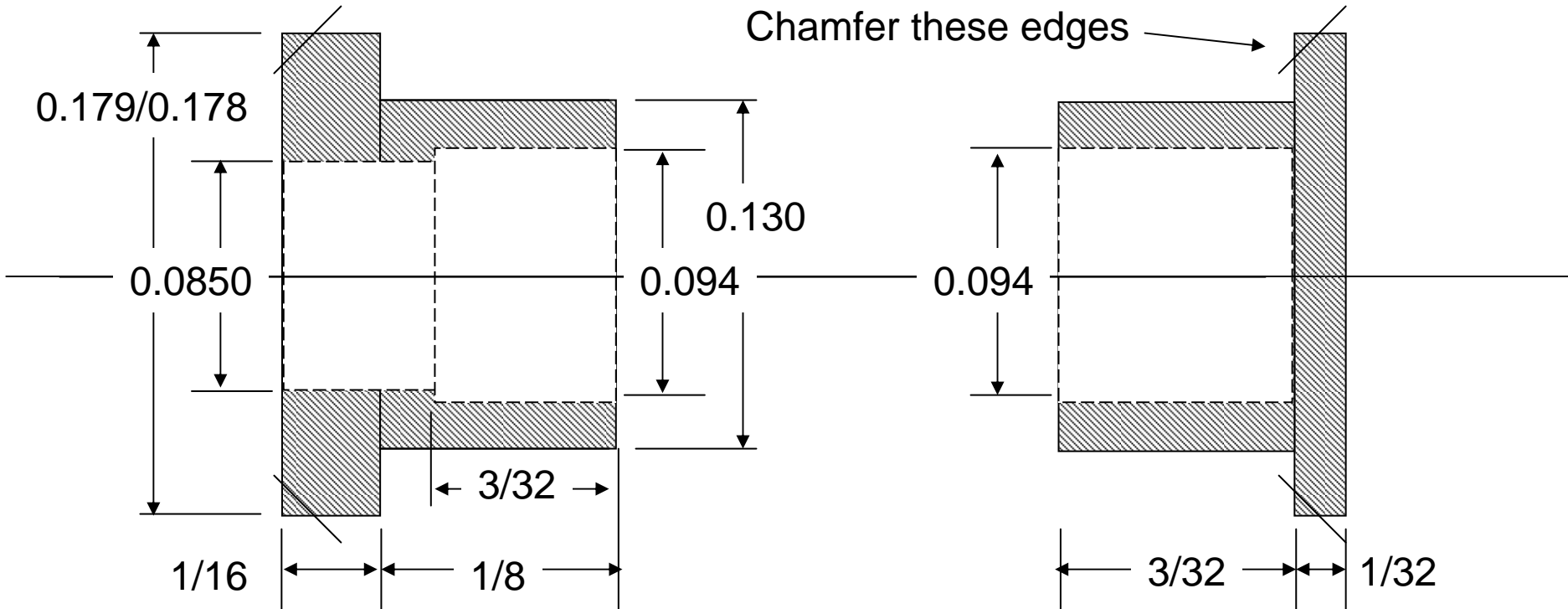
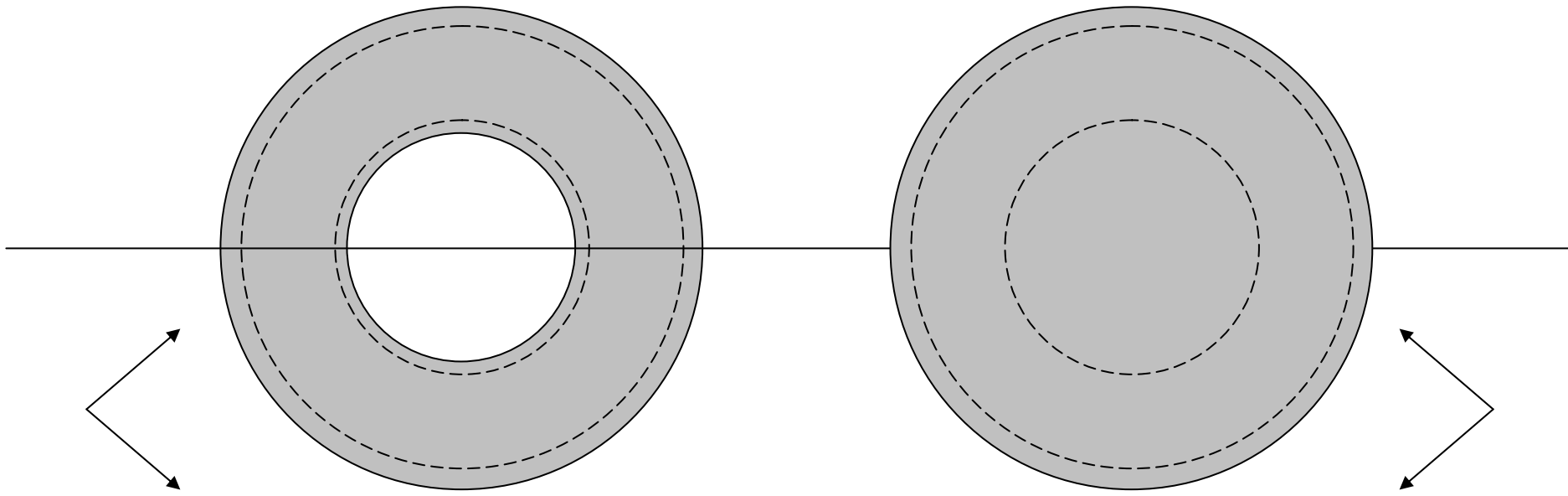
Fire Sabots: $V = 7 \text{ m/s}$

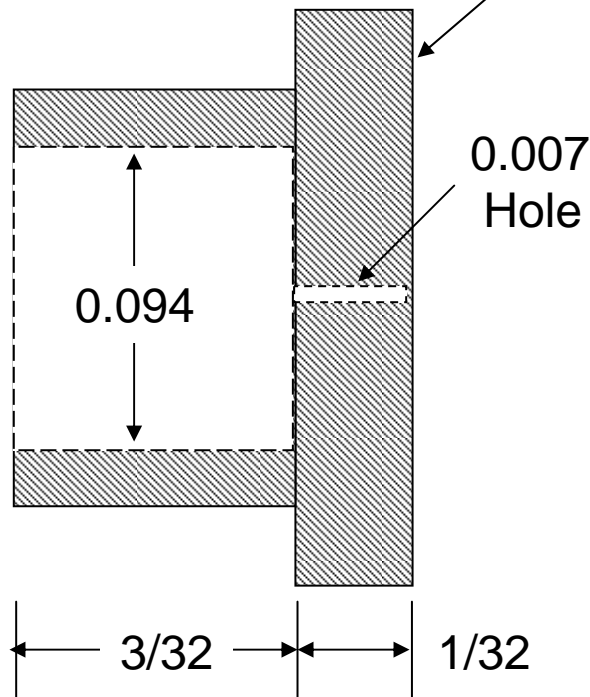
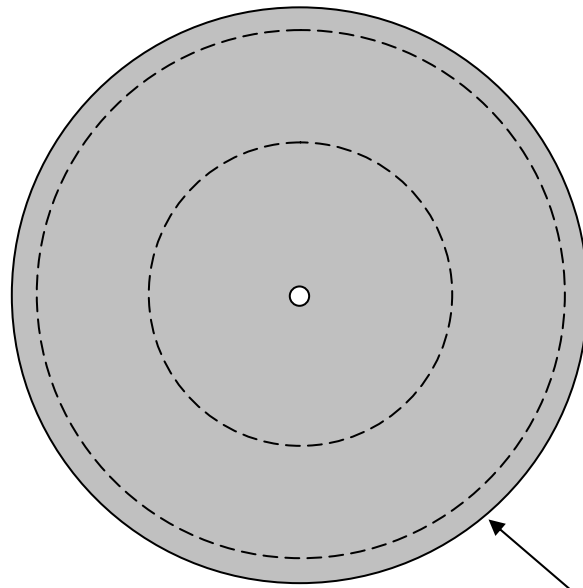
Deployment of Sabots in LPI

1								
2	Spare	Spare	Spare	Spare	Spare	Spare	Spare	Spare
3	<u>5</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>30</u>	<u>20</u>	<u>10</u>	<u>5</u>
4	<u>5</u>	<u>10</u>	<u>20</u>	<u>30</u>	<u>30</u>	<u>20</u>	<u>10</u>	<u>5</u>
5	Spare	Spare	Spare	Spare	Spare	Spare	Spare	Spare
6	Spare	Spare	Spare	Spare	Spare	Spare	Spare	Spare
7	Spare	Spare	Spare	Spare	Spare	Spare	Spare	Spare
8								
	1	2	3	4	5	6	7	8

Position

Barrel





Sabot Design Uses Commercially Available Stainless Tube

