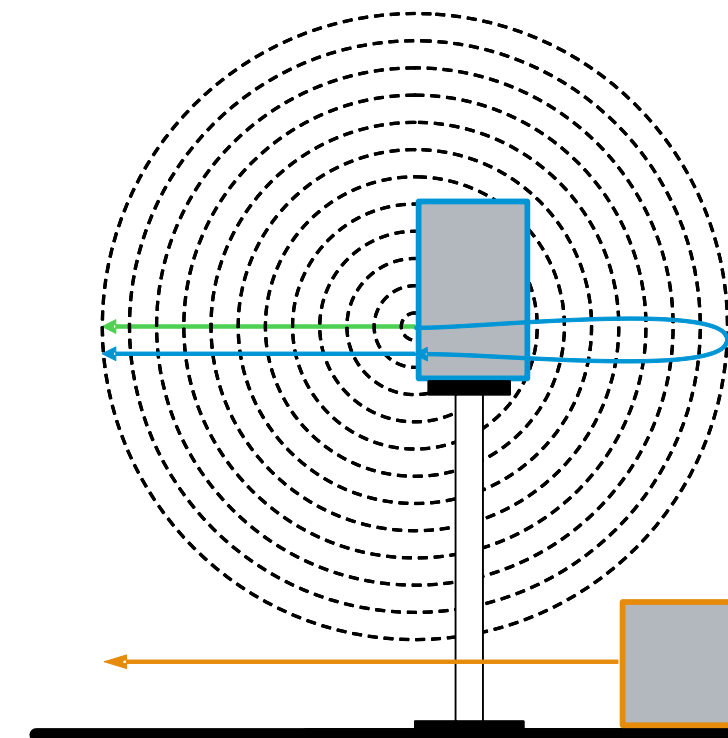


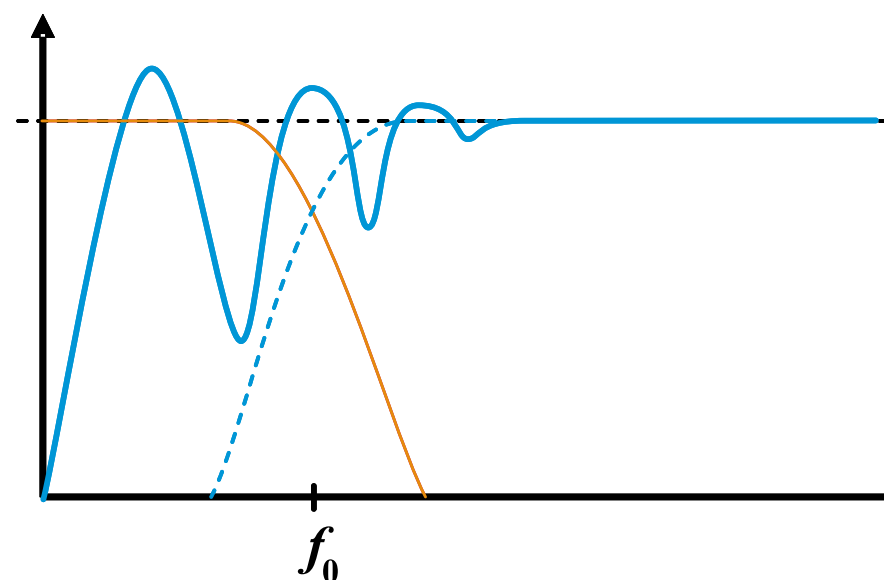
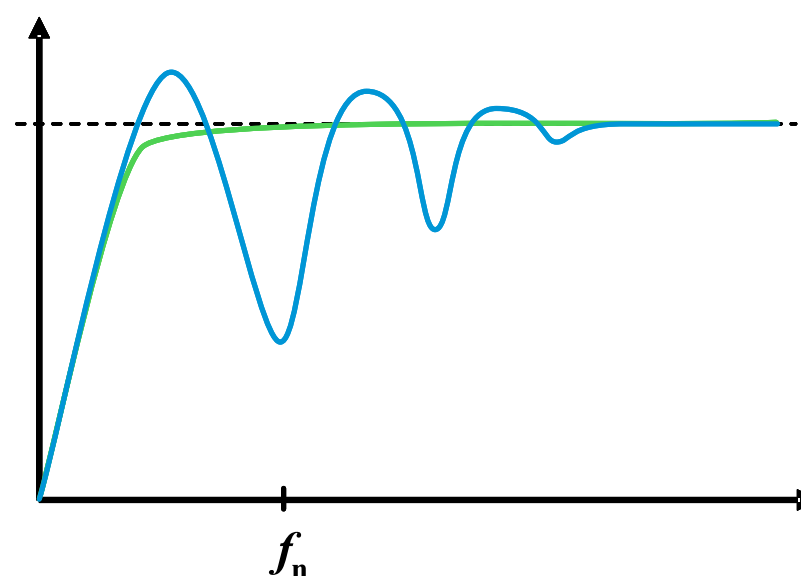
Loudspeaker-Boundary Location

- Low frequency energy from loudspeakers is omni-directional
- Direct sound combines with reflected sound
- Constructive and destructive interference (comb filtering) results
- First notch at $\frac{1}{4}\lambda$ is the strongest
- Move the loudspeaker and/or add a subwoofer
- Also consider the listening position's distance to the back wall ($\frac{1}{4}\lambda$)
- Also consider other $\frac{1}{2}\lambda$ cancellations from the side walls, floor and ceiling



Full Range Loudspeakers

Distance from Wall			First Notch
[m]	[ft]	[in]	[Hz]
0.20	0	8	430
0.40	1	4	215
0.60	2	0	143
0.80	2	7	108
1.00	3	3	86
1.20	3	11	72
1.40	4	7	61
1.60	5	3	54
1.80	5	11	48
2.00	6	7	43
2.20	7	3	39
2.40	7	10	36
2.60	8	6	33
2.80	9	2	31
3.00	9	10	29
3.20	10	6	27
3.40	11	2	25
3.60	11	10	24
3.80	12	6	23
4.00	13	1	22



Bass Managed Loudspeakers

Distance from Wall			First Notch
[m]	[ft]	[in]	[Hz]
0.20	0	8	430
0.40	1	4	215
0.60	2	0	143
0.80	2	7	108
1.00	3	3	86
1.20	3	11	72
1.40	4	7	61
1.60	5	3	54
1.80	5	11	48
2.00	6	7	43
2.20	7	3	39
2.40	7	10	36
2.60	8	6	33
2.80	9	2	31
3.00	9	10	29
3.20	10	6	27
3.40	11	2	25
3.60	11	10	24
3.80	12	6	23
4.00	13	1	22