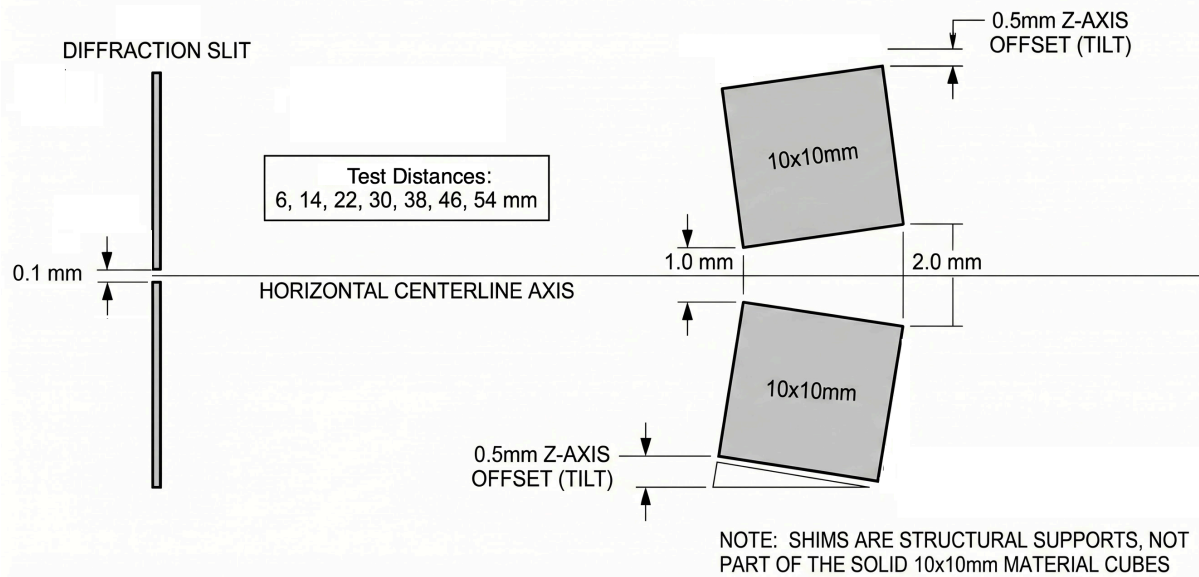


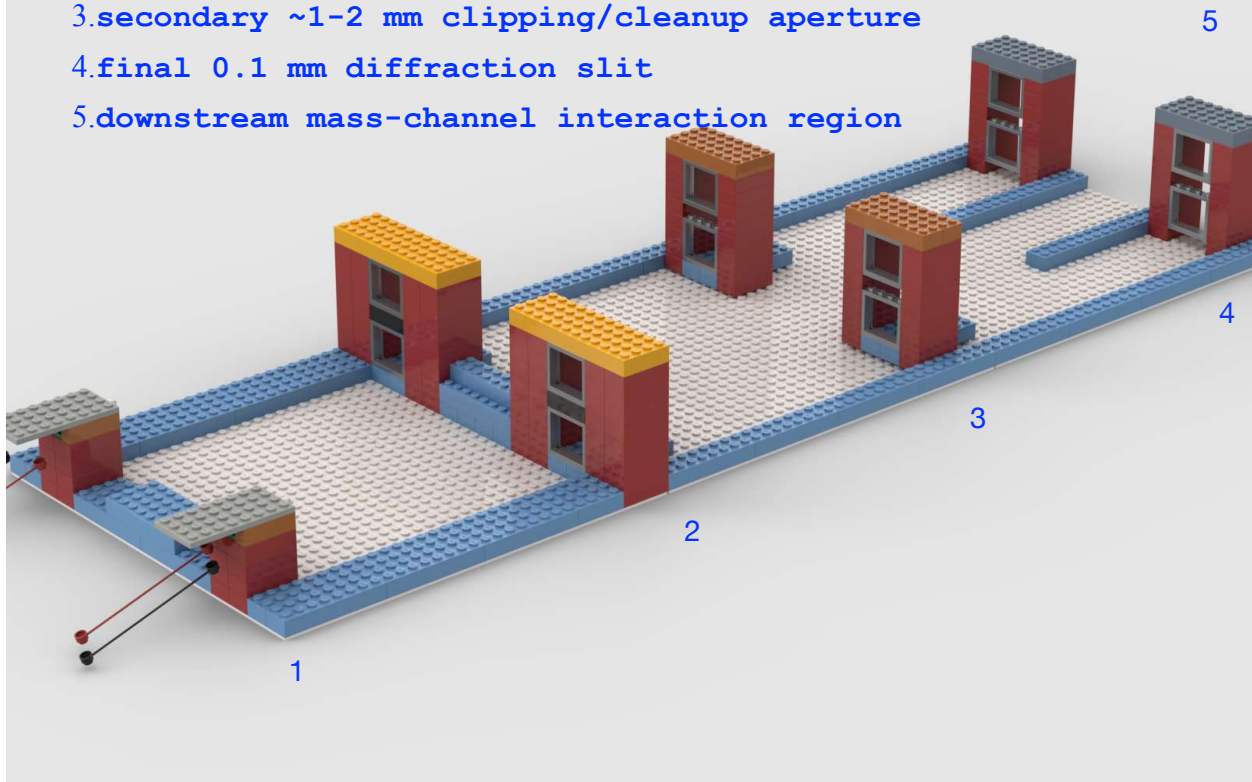
laser → slit 1 → cleanup → slit 2 → mass channel → measurement plane

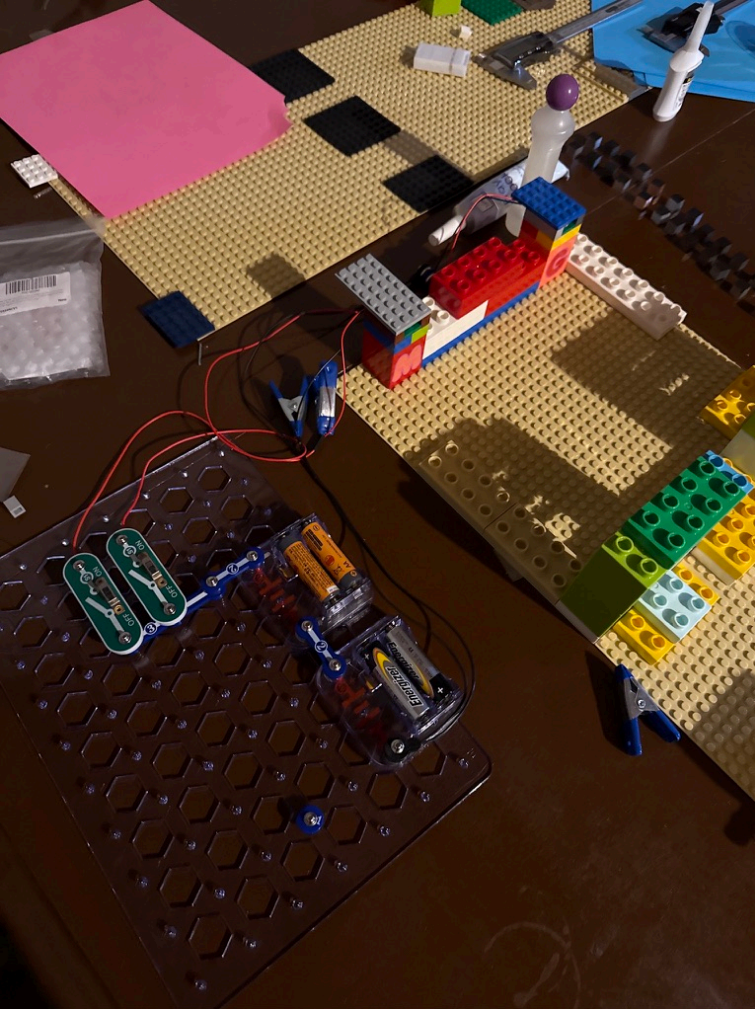
SCHEMATIC PROFILE OF AN OPTICAL MASS CHANNEL



staged beam-conditioning pipeline:

- 1.laser source
- 2.primary 0.1 mm diffraction slit (initial conditioning)
- 3.secondary ~1-2 mm clipping/cleanup aperture
- 4.final 0.1 mm diffraction slit
- 5.downstream mass-channel interaction region

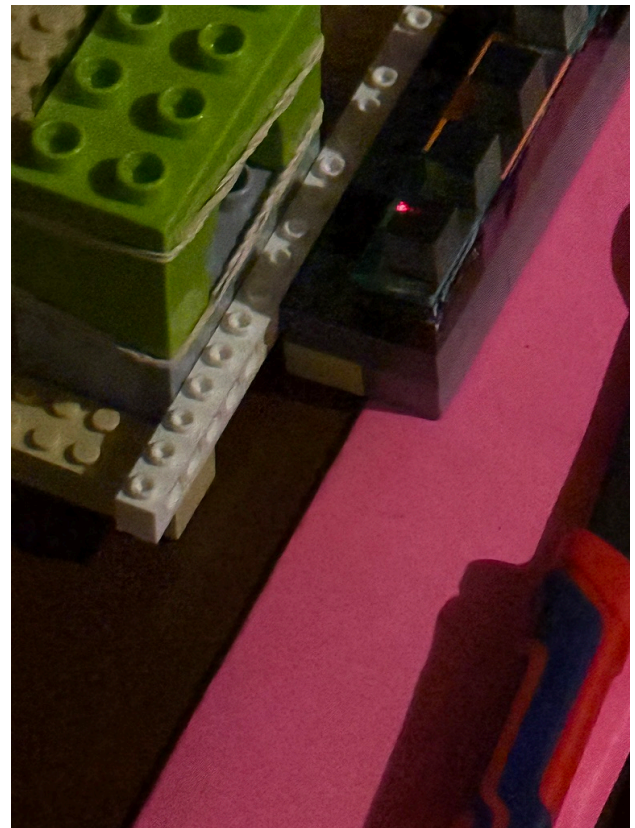




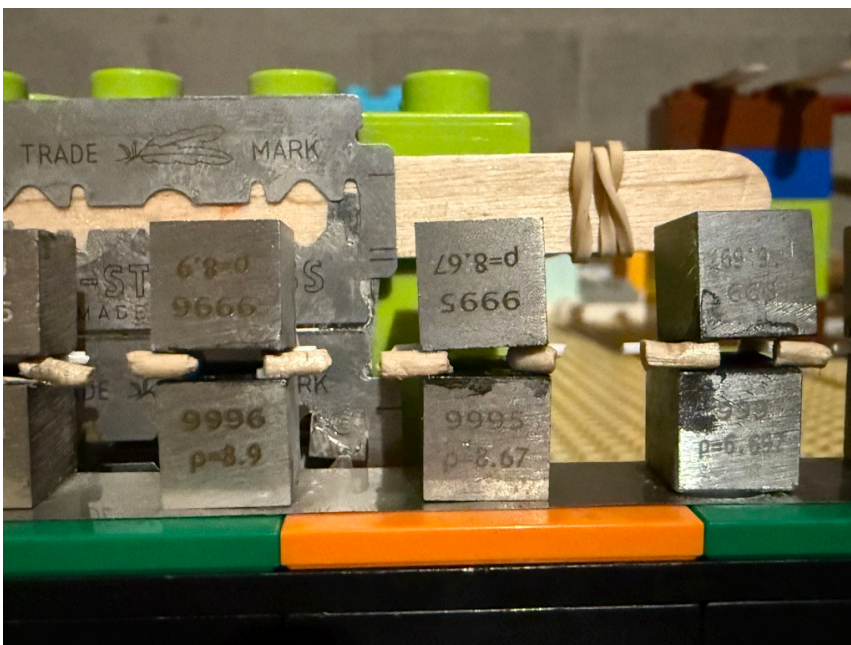
Isolated DC power supply



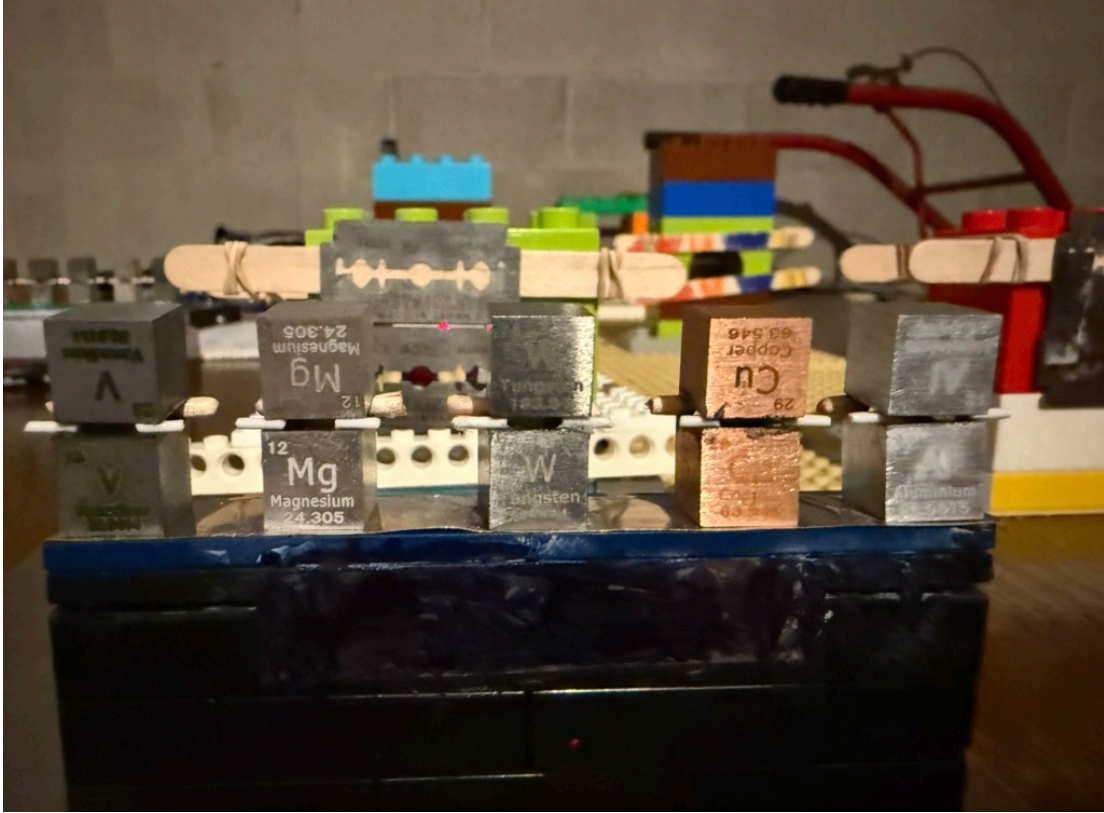
All inner surfaces of the Mass Density Cubes are painted with optically absorbent paint



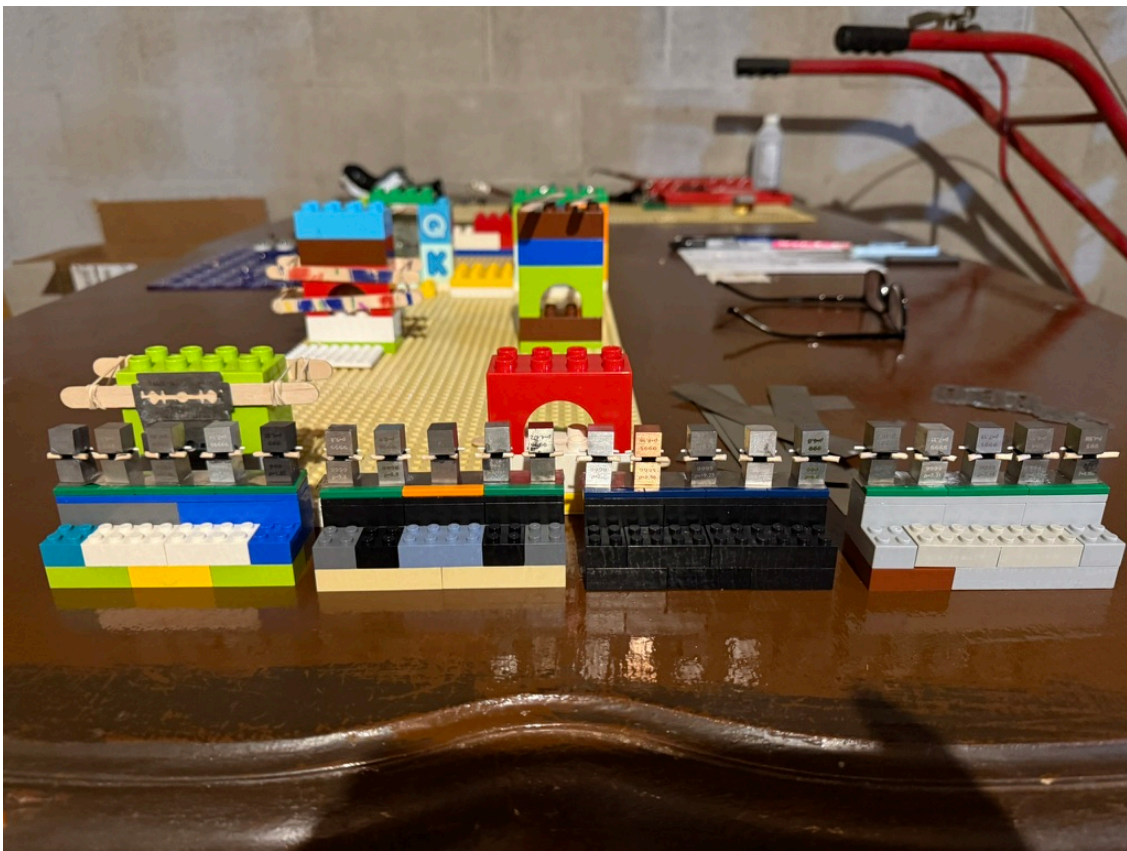
All inner surfaces of the Mass Density Cubes are spot checked to optically absorbent 95%-97%



Surfaces and edges are visually inspected after light sanding (3000 grit) for any obvious imperfections at 10x magnification



Five Mass-Channel Assemblies per set, leveled with each other with .02mm shims as needed



Four sets, Five samples per set - each leveled together for batch testing. Level to $\pm .05$ mm

Conducted in an underground basement 12 ft below ground with no ventilation and temperature stable to $\pm 0.5^\circ\text{F}$ over two weeks. Short ~3-minute test runs per set/distance, heavy wooden table, insulating LEGO structure, and baseline images taken before, during, and after each set/distance minimized thermal drift, vibration, and alignment