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Design of a flyer plate driven hydrodynamics experiment for Z[1]

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We present the preliminary design of a Z experiment intended to observe the growth of several hydrodynamic instabilities (RT, RM, and KH) in a high-energy-density plasma. These experiments rely on the Z-machine's unique ability to launch cm-sized slabs of cold material (known as flyer plates) to velocities of several times 10 km/s. During the proposed experiment, the flyer plate will impact a cm-sized target with an embedded interface that has a prescribed sinusoidal perturbation. The flyer plate will generate a strong shock that propagates into the target and later initiates unstable growth of the perturbation. The goal of the experiment is to observe the perturbation at various stages of its evolution as it transitions from linear to non-linear growth, and finally to a fully turbulent state.

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