COMPOSITIONAL ANALYSIS OF METEORITE DISRUPTIONS TO FIND MINERAL MAKEUP.

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Introduction: Experiments on extraterrestrial and terrestrial samples are done at the NASA Ames Vertical Gun Range (AVGR) to study disruption patterns of samples with different compositions [1, 2]. During these experiments it was observed that particles during a disruption would travel at different speeds and the speed of each particle was thought to be dependent upon its composition. Separation and analysis of individual particles from different times was necessary to determine the differences in their composition. To do this a detector needed to be designed that would collect and separate the particles as required.

Methods: The original design was a vertical sliding detector that stood about 2 feet tall. A rectangular slit in a slider exposed a small amount of an adhesive backdrop at a time. A four foot model of the same design was also tested, this time including a sheet covering the adhesive backdrop so all data collected was usable. A second detector design consists of four canisters that each have a lid that falls over the opening and sticks to a magnet to keep the lids closed. Each canister is wired to a program that delays the lids so they fall in succession, covering each of the canisters, successively.

Results and Discussion: The height and triggering of the first detector were problematic and fixed in the second model. The larger height allowed a longer drop time after the trigger but the top half of the detector did not collect any data. The canister design helped to fix the timing problem and allowed for better data analysis.

Analysis of the data collected in the canister design led to information regarding the composition of the disrupted sample and how to better adjust the original design in order to yield better results. The placement of the cans can be improved upon by having four separate frames to collect the most data. The data collected was kept separate by the canister it was collected in and observed under a microscope. The canister that closed the earliest had the smallest particles and a lot of dust, all composed of a single mineral. The next canister collected very little data, it contain one small particle and the canister was lined with dust from the disruption. The third contained larger pieces than the first and the mineral composition was much clearer in the larger pieces. The last canister had several larger pieces of different minerals. An analysis is in progress to determine the exact compositions of the different minerals.

References: [1] Flynn, G. J. et al. (1997) *Planetary Science,* **57,** 119-126. [2] Durda, D. D. and Flynn, G. F. (1999) *Icarus,* **142,** 46-55.