

# Designing and testing a LASER ignition cell for propellants

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***Abstract:** Propellants are commonly used in the industry when it comes to generate an important quantity of gas in a short delay. The systems existing in the industry uses a primary and booster (gunpowder, propellant) to ignite the propellant charge. Ignition of propellants in gas generator devices is all the more important that initial pressure is driving the pressure profile and the behavior of the combustion. The propellant need a certain amount of energy to react, which can be provided by pressure, conduction, convection, hot particles or radiation. The aims of this project are to understand the effect of radiative flux, and to design and to experiment a laser ignition cell with calibrated and measurable parameters. The laser consists in a stable and repeatable source of light radiation. The point is to understand the influence of this radiation on the decomposition and the ignition of composite propellant used in airbag gas generators considering a range of different powers and different delays of exposure. The main parameter measured is the time of ignition. Nevertheless for a more accurate description of the phenomenon, high-speed cameras (visible and IR) and thermocouple will be used. This will lead us to the observation of fusion, decomposition and ignition of composite propellant to have a better understanding of those phenomena and to compare with analytic and numerical results.*

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