Scramjets are efficient air-breathing engines that operate at speeds greater than 6,000 km/hr. An accelerating aircraft must compromise performance at a design point to ensure it operates efficiently throughout the entire range of speeds. A flow process called Thermal Compression can be used to ensure effective combustion throughout different flight conditions. This is achieved by creating non-uniform regions of high temperature and pressure where combustion is initiated, which then increases the temperature and pressure of the surrounding fluid until the entire air-fuel mixture combusts.

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This seminar presents results from experimental investigations into a thermal compression scramjet engine. Pressure measurements and Laser-Induced Fluorescence (LIF) of the OH radical are used to examine how combustion in each half of the engine influences combustion in the other. This is supported by numerical simulations that give further insight into flow field properties.