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The effects of gas pressure on liquid splashing LEI XU, WENDY ZHANG, SIDNEY NAGEL, University of Chicago — The corona splash due to the impact of a liquid drop onto a dry smooth glass substrate is investigated with high speed photography. We find a striking phenomenon that the splashing vanishes when the surrounding gas pressure is lowered. The relationship of threshold gas pressure (where the splashing ceases to occur) to the impact velocity is measured. Four different gases (Air, He, Kr, SF₆) as well as three different liquids (Methanol, Ethanol and 2-Propanol) are used in the experiment. We find a scaling relationship of the threshold pressure in terms of the gas molecular weight and liquid viscosity. A model considering compressibility of the gas is proposed to explain these observations. These experiments shed new light on the phenomenon of how a splash is generated when a liquid hits a smooth substrate.

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