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Dynamics of entrained air film upon drop impacts on lubricated inclined surfaces. ALLISON KAMINSKI, ARIF ROKONI, LIGE ZHANG, YING SUN, Drexel University — The dynamics of an entrained air film and its failure mechanisms upon drop impact, on atomically smooth silicone oil lubricated surfaces, are studied using high-speed total internal reflection microscopy and reflection interference microscopy techniques. The effects of surface tilt angle, from $0^o$to 45^o, weber number, *We,* from 1 to 30, and ambient pressure, from 3 kPa to 1 atm, on air film failure were examined. Two different air film failure mechanisms were observed and found to be independent of surface tilt angle and ambient pressure, whereas the location of air film failure varies with the tilt angle. For intermediate *We* (˜1 $<$*We* $<$O (10)), drop-film contact is initiated due to the downward motion of the drop's top surface from impact-induced capillary waves, whereas the air film failure occurs much earlier at the kink, dominated by the disjoining pressure for large *We* (*We* $>$O (10)). The transition from capillary wave failure to disjoining pressure failure depends on surface tilt angle and ambient pressure, and this transition happens earlier for larger tilt angles and smaller ambient pressures.

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