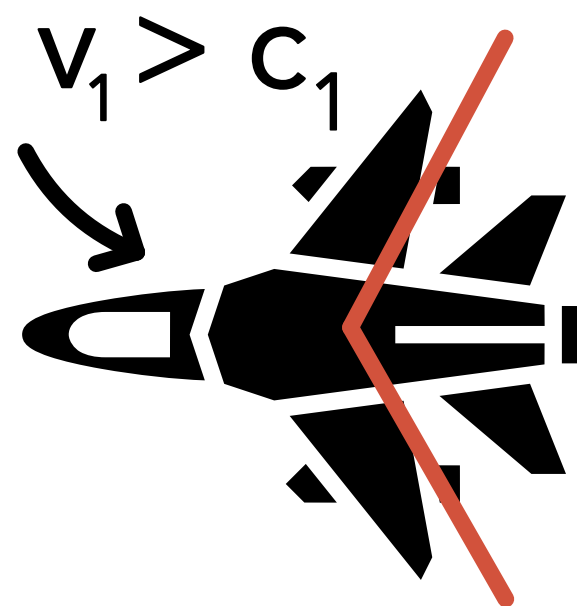


supersonic jet,  $v_1 > c_1$

pre-shock



post-shock

normal  
shock

$\sim \lambda_{\text{eff}}$

effective  
mean free  
path

**upstream** conditions  
ahead of normal shock

**downstream** conditions  
behind normal shock



$v_1$  in shock frame

supersonic

$P_1, T_1, \rho_1$



$v_2$  in shock frame

$P_2, T_2, \rho_2$

slower, denser warmer

subsonic

viscous effects dissipate kinetic  
energy  $\rightarrow$  heat & entropy

viscous effects small; fluid variables linked by jump conditions

X