

50. We are combining two effects: the reception of a moving object (the truck of speed  $u = 45.0$  m/s) of waves emitted by a stationary object (the motion detector), and the subsequent emission of those waves by the moving object (the truck) which are picked up by the stationary detector. This could be figured in two steps, but is more compactly computed in one step as shown here:

$$f_{\text{final}} = f_{\text{initial}} \left( \frac{v + u}{v - u} \right) = (0.150 \text{ MHz}) \left( \frac{343 \text{ m/s} + 45 \text{ m/s}}{343 \text{ m/s} - 45 \text{ m/s}} \right) = 0.195 \text{ MHz} .$$