The P-Wave shadow zone exists from 103-142 degrees away and is due to the fact that P-waves are refracted upon entering the outer core (they slow down).

The S-wave shadow zone is from 103-180 degrees away and is due to the fact that the outer core is made of liquid.
Earth Structure From Earthquakes

• Recall:
  – P-Waves are fastest and can travel through all media
  – S-Waves cannot travel through liquid or gas.

Snell’s Law

• As a wave (represented by its ray path) moves through layers of different density it will bend.

Case 1: Layer 2 is ‘faster’ than Layer 1

\[ V_2 < V_1 \]

Case 2: Layer 2 is ‘slower’ than Layer 1