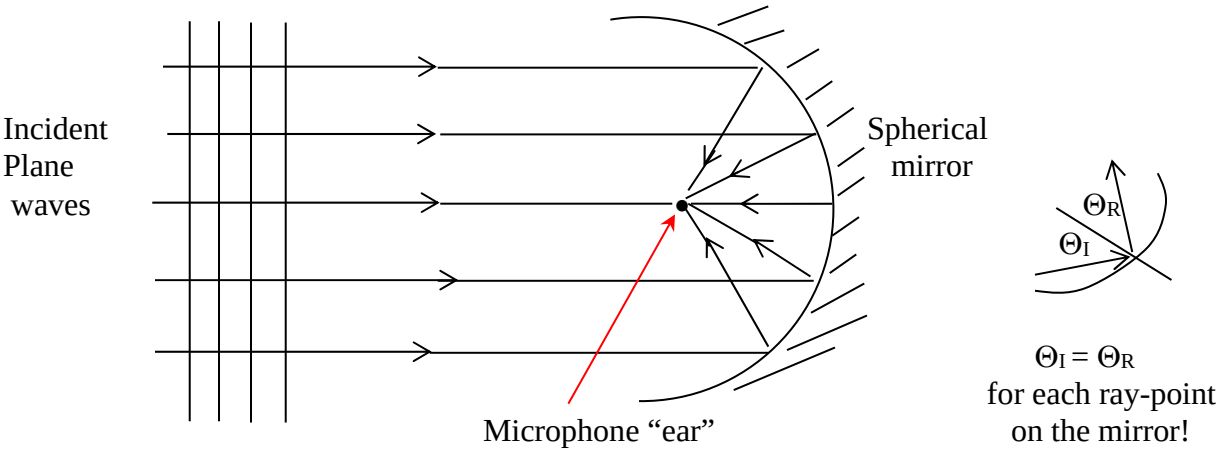
Time-Reversed Situation:

If the sound source is located infinitely far from the focal point of spherical mirror, *i.e.* $S_{source} = \infty$, the sound from the source impinges on the spherical mirror as plane waves, and the sound converges to the focal point of the acoustic mirror – just as in the optics case! The observer location is at the focal point of the mirror, $S_{observer} = f = R/2$.



Thus, a spherical acoustic mirror can be used as a *supersensitive* "ear" – focusing (i.e. converging) the incoming sound plane waves to a single point - at the focus of the mirror! Using two such acoustic mirrors facing each other and *e.g.* separated by a large distance $d = 100$ *ft*, two people, each standing at the focus of one mirror (and facing it) whispering to each other can very clearly hear each other – this two-mirror configuration is known as a *whispering gallery*…

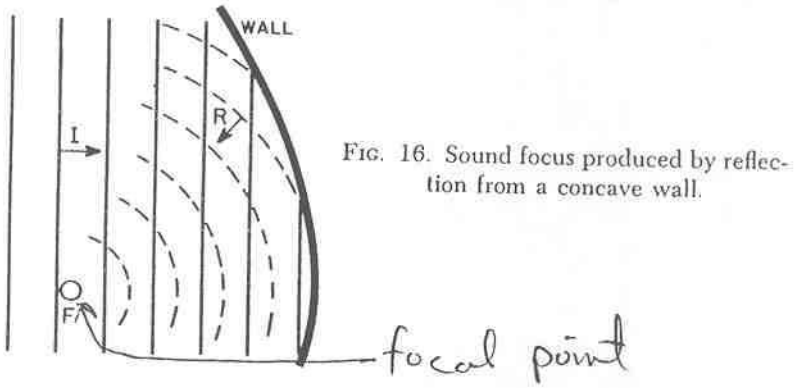


FIG. 16. Sound focus produced by reflection from a concave wall.

n.b. The sign conventions needed/used in acoustic mirror equation (above) are the same as that as used in optics with the optical mirror equation for optical image formation with an optical mirror.

Sound waves behave very similarly/analogously to that of light waves/*EM* waves (photons)!