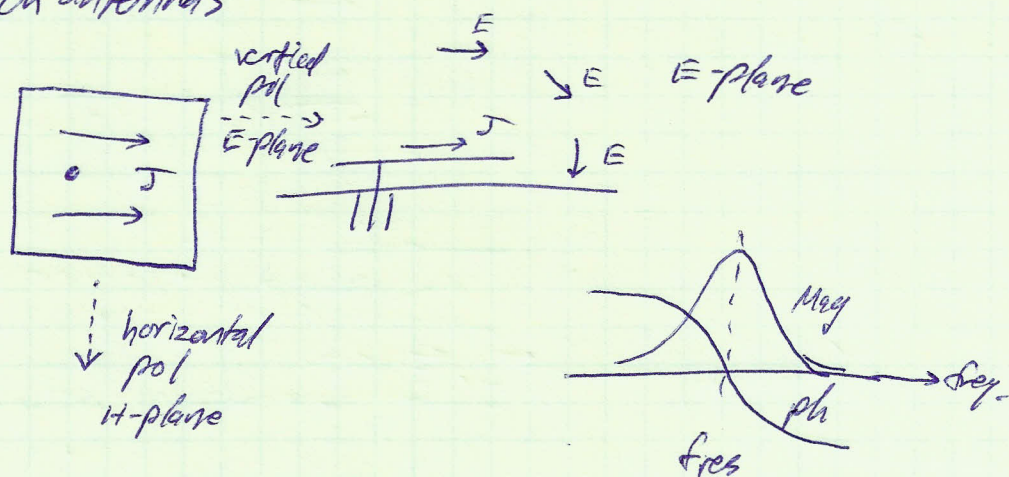
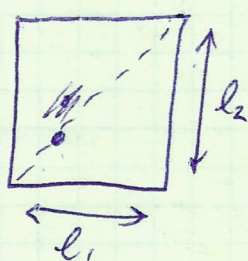


Polarization in antennas and optics

- patch antennas



CP patches - tune 2 modes to $\pi/2$ phase difference



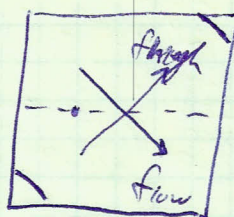
$l \approx \lambda/2$ in dielectric

If $l_1 \neq l_2$, horizontal and vertical frequencies will be slightly different

feed will excite both if on diagonal axis

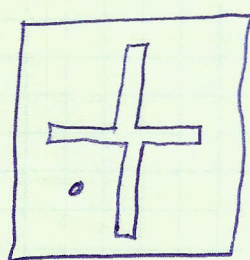
In practice, it is difficult to design to $\pi/2$ phase difference

Easier to design like this

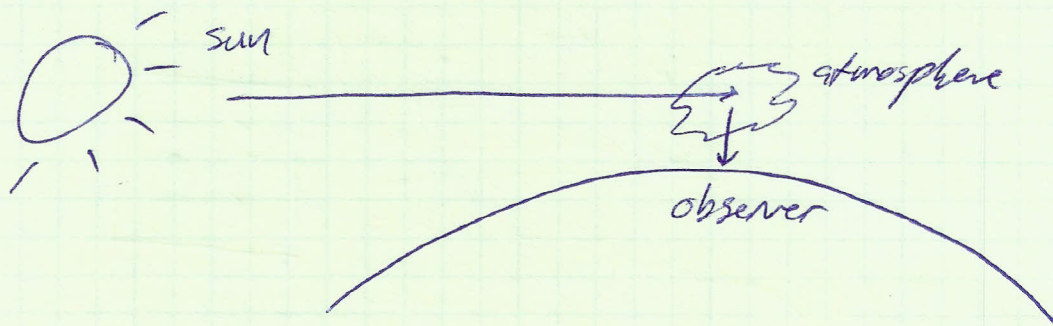


trim corners to tune 2 modes to $\pi/2$ phase difference

Can also use 2 slots in a cavity



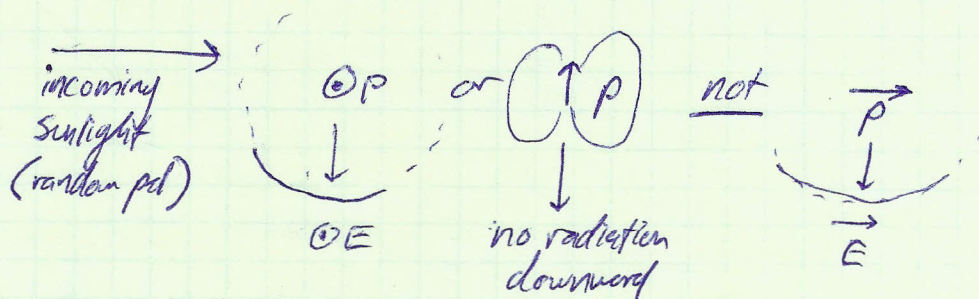
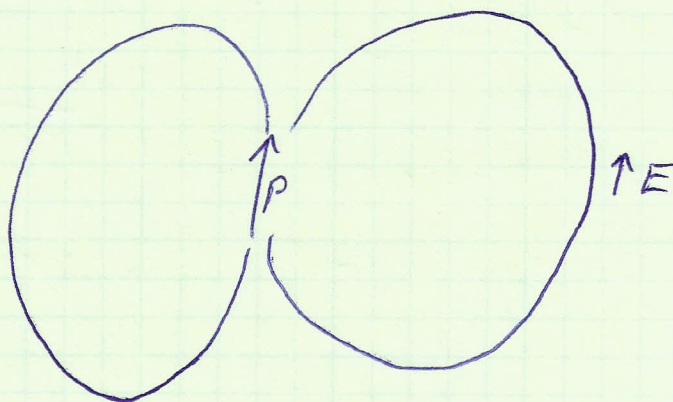
polarization of scattered sunlight



Sun is randomly polarized

Scatters from molecules in the air $\rightarrow$ excites oscillating electric dipoles

dipoles radiate with this pattern



Sunlight is slightly polarized
(not perfectly, due to additional scattering)