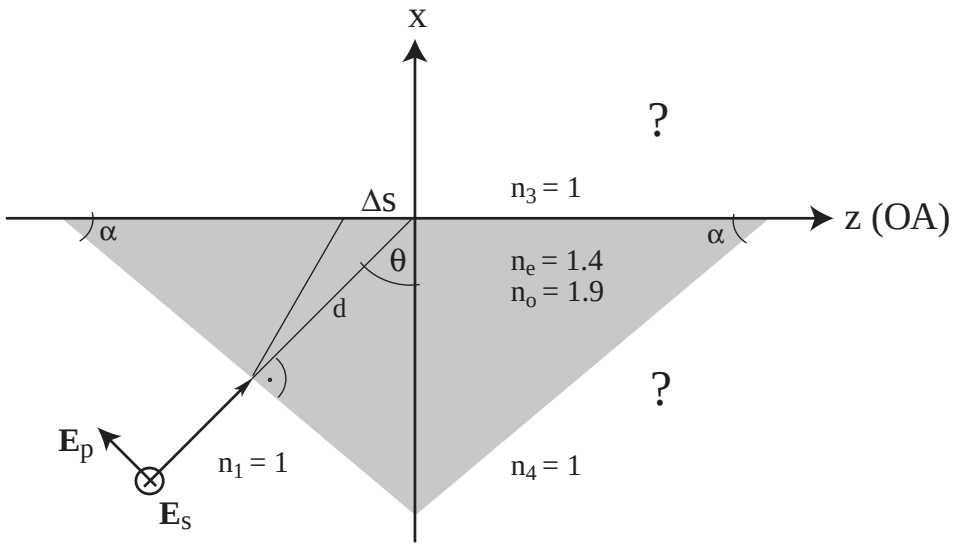
OPT 462: Homework Set 11 **Due on April 25, 2001**

1 Reflection from the surface of a uniaxial crystal

A uniaxial crystal ($n_o = 1.9$, $n_e = 1.4$) in the shape of a prism is irradiated by an unpolarized plane wave as shown in the figure below. The incident field **E** can be decomposed into an s-polarized wave and a p-polarized wave. The optical axis of the crystal is parallel to the upper surface of the crystal.



- Determine the displacement Δs between o-ray and e-ray as a function of θ and d.
- Determine the angular range θ for which the o-ray, the e-ray or both undergo total internal reflection.
- Is there an angle θ for which one wave is totally transmitted and the other totally reflected?
- For $\theta = 35°$ calculate the angles of propagation of the transmitted and reflected rays outside the crystal.