

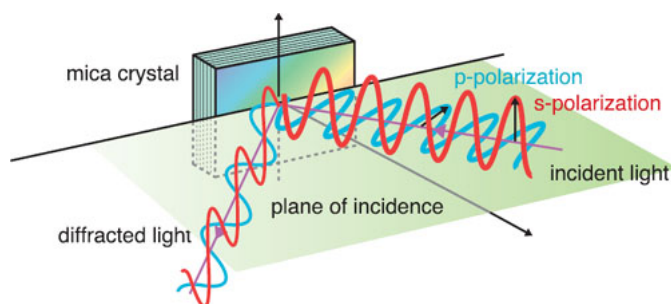
# Lesson no. 6

20 March 2023

1. Consider a light ray which strikes the glass plate (with constant non-zero thickness) placed in the vacuum. We know, that the velocity of light distribution in the glass is 54% of the one for vacuum.

What is the angle of refraction when the ray strikes the glass plate at an angle  $60^\circ$ ?  
What is the angle of refraction, when the ray leaves the glass plate?

2. What amount of the light energy is reflected/transmitted, if the light hits the water surface by the angles  $30^\circ$  and  $80^\circ$ , respectively? Use the Fresnel equations for s- and p-polarized light in your computations.



3. Consider the scene with the golden ball and the point lamp. The viewer stands in the point  $(-1, 0, 5)^\top$ , and the position of the lamp is  $(10, 0, 20)^\top$ . The color of the light is  $(1, 1, 1)$ , and the ambient coefficient is 5%. Gold is characterized by the following values:

$$k_a = (0.247, 0.199, 0.075),$$

$$k_d = (0.752, 0.606, 0.226),$$

$$k_s = (0.628, 0.556, 0.366),$$

$$n_s = 51.2.$$

What color is seen in the point  $(0, 0, 1)^\top$  with the normal vector  $(0, 0, 1)^\top$ , if we use the Phong illumination model?