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Evanescent waves

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See Unified Absolute Relativity Theory at:

http://www.wbabin.net/saraiva/saraiva105.pdf
http://www.wbabin.net/saraiva/saraiva223.pdf

Evanescent waves have imaginary wavelengths so they are longitudinal waves or virtual photons.

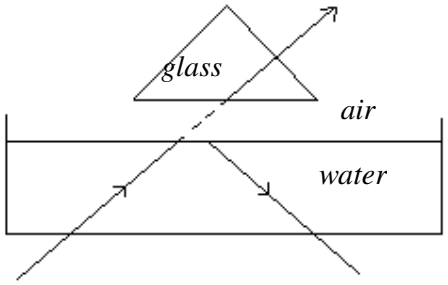
Minimum energy of an evanescent wave:

$$E = \frac{hc}{\sqrt{k}} = 89.63GeV \ ; \qquad k = 1.9 \times 10^{-34} m^2$$

Speed:

$$w = \sqrt{k} f = \infty$$

The speed of the minimum energy evanescent wave is infinite.
An infinite frequency wave appears to be a static wave.



Energy of a wave in an optical medium:

$$E = \frac{hc}{\sqrt{k}} \sqrt{n^2 - 1}$$

For minimum energy: $n = \sqrt{2} = 1.41$

Refractive index of the water

$$n = 1.333 + 3.538\times10^{-31} f_0^{\,2} = 1.41$$

$$\Leftrightarrow \qquad f_0 = 4.665\times10^{14}\, Hz\,; \qquad x_0 = 642.62 nm$$

For the existence of evanescent waves from water/air the frequency of the light in the air must be greater than this frequency.

This is a test of the true nature of the evanescent waves.

Gallium phosphide and UV light

$$f = 2 f_M \sqrt{\frac{n-1}{n+1}}$$

$$w = 1.2c = \sqrt{kf^2 - c^2} \qquad \Leftrightarrow \qquad f = 3.385\times10^{25}\, Hz$$

$$\Leftrightarrow \qquad n > 4.13$$

Refractive index:

$$n = 3 + 1.42\times10^{-30} f_0^{\,2} = 4.13$$

$$\Leftrightarrow \qquad f_0 = 8.92\times10^{14}\, Hz\ ; \qquad x_0 = 336.1 nm$$