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**Physics of Superluminal Communication and Estakhr Relativistic Omega Factor** AHMAD REZA ESTAKHR, Researcher — Superluminal communication is a process by which one might send information at FTL (Faster Than Light). I try to developed this idea in detail and with mathematical rigor. The velocity of particle (information) is represented by the group velocity $v_g$. if $v_g \geq c$ then $\gamma = \frac{-i}{\sqrt{\frac{v_g^2}{c^2}-1}} = -i\Omega$ that which means $\gamma$ (Lorentz factor) is an imaginary number (at $v_g \geq c$), that can be written as a real number multiplied by imaginary unit $i$, which is defined by its property $i^2 = -1$. and this is $\Omega = \frac{1}{\sqrt{\frac{v_g^2}{c^2}-1}}$ Estakhr Omega factor. then kinetic energy of FTL particle is Complex number $k = E - E_o = -E_o(i\Omega + 1)$. we still use Lorentz Symmetry, $\gamma^2 - \gamma^2\beta^2 = 1$ which means faster than light is particle-like, $i^2\Omega^2 - i^2\Omega^2\beta^2 = \Omega^2\beta^2 - \Omega^2 = 1$. The phase velocity can be found from $v_{ph} = \frac{c^2}{v_g}$, this shows that the phase velocity of FTL particle is less than the speed of light $v_{ph} = \frac{c^2}{v_g \geq c} \leq c$. which means that speed of material particles can exceed $c$ but finally, the product of the group and phase velocities is equal to $c^2$, in general: if $v_g \leq c$ then $v_{ph} \geq c$, if $v_g \geq c$ then $v_{ph} \leq c$, if $v_g = c$ then $v_{ph} = c$ i.e., $v_g v_{ph} = c^2$.

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