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Photon's Wavelength Stretching and Shrinking? FLORENTIN SMARANDACHE, University of New Mexico — The photon is considered of having a dual form: wave and particle. (a) If the photon is a wave, it has been asserted that the photon's wavelength is stretched inside the intergalactic space, because of the expansion of the universe. But what happens with the photon's wavelength when the photon enters a galactic space (which is not expanding), and afterwards it exists the galactic space and enters an intergalactic space (which is expanding), and so on? But, when the wavelength increases the wave frequency decreases (redshift); therefore the wave's momentum and energy are diminished in the expansion of the universe. It seems to be an antithesis between the quantum mechanics (Copenhagen style) and the universe expansion. (b) If the photon is a particle, similarly because of the so-called expansion of the universe, does its pathlength increases inside the intergalactic space (which is expanding) and decreases inside the galactic space (which is not expanding)? Thus, what happens with its pathlength when the photon passes from an intergalactic space to a galactic space, then again to intergalactic space, and so on?

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