

# **Dispersion of a Single Atom Experienced by Single Photon**

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Refractive index of a system is typically considered as the bulk response of a medium to an incoming electromagnetic field. However, the incoming light would experience the same dispersion even with a single atom at the target. In this talk, we will consider propagation of single photon interacting with a single two-level atom to determine the dispersion behavior and also calculate the phase and group velocity of the single photon wave packet to further analyze the dispersion experienced by the single photon. The results are of significant importance for long-distance quantum communications.