

Abstract Submitted
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Source distance information and frequency shifts by chirp decomposition V. GURUPRASAD, Inspired Research, NY — Innovative frequency shifts directly revealing the source distance of received signals are obtainable from phase spectra as follows. The phase expression for a travelling wave, $\phi = -\omega(t - r/c)$, implies increasing static phase differences $\delta\phi(r) = r \delta\omega/c$ between adjacent frequencies in the radiated waves. The static differences are useless for information transport and hard to measure, hence were hitherto generally ignored. Scanning the spectrum transforms them to Doppler-like shifts revealing the distance, given by the partial derivative $\delta\omega(r) = \partial\phi/\partial t|_{r,t} = \dot{\omega}r/c$, where $\dot{\omega}$ is the scanning rate, provided the signal has nonzero bandwidth. By controlling $\dot{\omega}$, any source can now be instantly ranged or isolated, allowing separations down to 10 m at 100 m range for 10 MHz voice modulated carrier – without CDMA or power control, as described at IEEE WCNC 2005. The mechanism is also realizable by simple chirp transform, and has been verified by simulation and with acoustic signals. EM field tests are now being arranged. The results and other aspects of general physics interest will be discussed.

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