Joint Caltech RF & Microwave and
Applied Physics Optics Seminar

MICROWAVE AND MILLIMETER WAVE SIGNAL TRANSMISSION VIA OPTICAL FIBERS

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The subject of millimeter wave signal transmission in optical fibers has NOT been discussed in any previous book or many publications. The frequency of available optical transmission links up to this point has been limited to the lower GHz range or up to 10-20GHz range at the most; one reason for this state of affair, I believe, is that the commercial mass application potential of this millimeter wave signal transmission technology wasn't well appreciated by the general fiber-optic community. So far the only known means of accomplishing optical modulation of a signal comprising of multi-Gbit/s data bandwidth on a millimeter wave carrier in the 70-90GHz band is by the use of narrow-band impedance-matched Mach-Zehnder electro-optic modulators which are rather bulky and expensive to produce. Recent results to be described in this talk reveal that similar millimeter-wave modulation functions can be accomplished by modulating a single-chip laser diode which should be no more expensive to fabricate or to manufacture than a conventional telecom laser chip as long as proper operating conditions are met.

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