

## Realization of Soliton Phase Characteristics in 10 Gbps, Single Channel, Uncompensated Telecommunication System

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**Abstract :** In this paper, the dependence of soliton pulses with respect to phase in a 10 Gbps, single channel, dispersion uncompensated telecommunication system was studied. The characteristic feature of periodic soliton interaction was noted at the Interaction point ( $I=6202.5\text{Km}$ ) in one collision length of  $L=12405.1\text{ Km}$ . The interaction point is located for 10Gbps system with an initial relative spacing ( $q_0$ ) of soliton as 5.28 using Perturbation theory. It is shown that, when two in-phase solitons are launched, they interact at the point  $I=6202.5\text{ Km}$ , but the interaction could be restricted with introduction of different phase initially. When the phase of the input solitons increases, the deviation of soliton pulses at the  $I$  also increases. We have successfully demonstrated this effect in a telecommunication set-up in terms of Quality factor ( $Q$ ), where the  $Q=0$  for in-phase soliton. The  $Q$  was noted to be 125.9, 38.63, 47.53, 59.60, 161.37, and 78.04 for different phases such as 10o, 20o, 30o, 45o, 60o and 90o degrees respectively at Interaction point  $I$ .

**Keywords :** Soliton interaction, Initial relative spacing, phase, Perturbation theory and telecommunication system

**Conference Title :** ICC 2015 : International Conference on Computing, and Communications

**Conference Location :** San Francisco, United States

**Conference Dates :** June 07-08, 2015