Simulative analysis of enhanced data rate using light wave system

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Abstract : For next generation network required that high data rate along the good quality of service ,when data rate is increased losses are also increased. At the high data rate, dispersion is occurred so that we need dispersion compensating techniques. in this paper we will vary the data rate at adequate level. our link designing is without using dispersion compensating techniques. Transmission distance is several hundred of kilometre has been used. The performance characteristics like that that maximum bit error rate yields for different data variation.

Keywords:- *data rate, dispersion, BER, Quality factor, optical fiber.*

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I. INTRODUCTION

the high data rate with good quality can be full fill with optical fiber communication work with low attenuation losses [1]. In optical fibre communication fibre dispersion and non linearties are occurred sometime in fibre communication timing jitter effect also occurred [2]. most researches implied EDC at the receiver ,so that the system efficiency is increased [3]. to increase the fibre capacity we can use raising OSNR, reduce the channel spacing or by installing different higher modulation techniques [4] . the dispersion limits the maximum data transmission so that we need that dispersion compensating techniques .we can use dispersion compensation fibre at the palace of single mode fibre, which are designed with negative coefficient [5]. The positive compensation was cancelled with the negative EDFA [6]. There are some other different methods that can be used to compensating the dispersion including DCF, chirped bragg grating ,all pass optical fibre and optical phase conjugation[7] .these methods restore the signal as it received at the normal receiver [8].

II. SIMULATION SETUP

For upgrading the present network it is desire that system should have same amplifier spacing as previously existing [9].in our research aims at the frequency at 1550nm ,with the power level is 4nm(equal to 6dbm) access with the line width of continuous wave (cw).

In this research we will vary the bit rate across the several hundred kilometre with 0.2

dbm/km attenuation. There is two EDFA is used with gain 10db and 5db and noise figure is 6db. Cut off frequency of low pass filter is 7.5 Ghz. loop controller is used.to generate the pulse on and off we use pseudo random bit sequence generator. RZ pulse generator is used to generate the coded signal. Mach-Zehnder modulation is used to simply controls the phase and amplitude of the transmitted signal. Photodector PIN is used at receiver. optical power meter and oscilloscope is used for visual analysis of the result ,an BER analyser is also used for the representation of the eye diagram ,quality factor and minimum bit error rate.

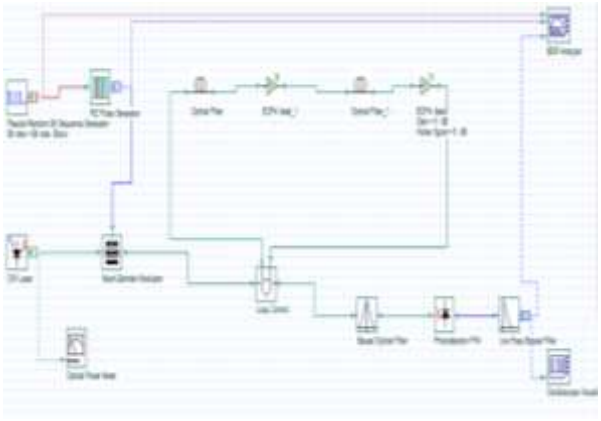

Fig.1.Block diagram of data transmission

III. RESULT AND DISCUSSION

To vary a data a rate there are number of parameter has been used like that CW laser frequency ,power and its line width .number of times we vary the different parameter to get the result than after setup is working than put these parameter constant and vary the bit rate.

Table 1.corresponding results

Bit rate(gbps)	Quality factor	BER
40	9.06	4.91e-020
45	7.45	3.52e-014
50	7.55	1.67e-014
55	6.6	1.08e-011
60	7.45	3.39e-014
65	7.81	2.07e-015
70	7.85	1.46e-015
75	7.99	5.20e-016
80	7.99	5.38e-016
85	6.02	2.72e-010
90	6.56	2.34e-011
95	4.74	8.86e-007
100	4.14	1.44e-005

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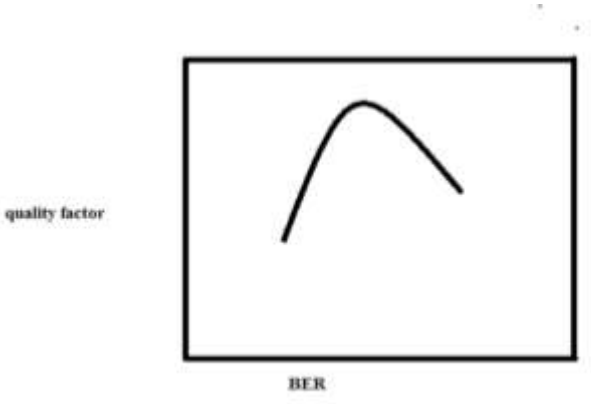
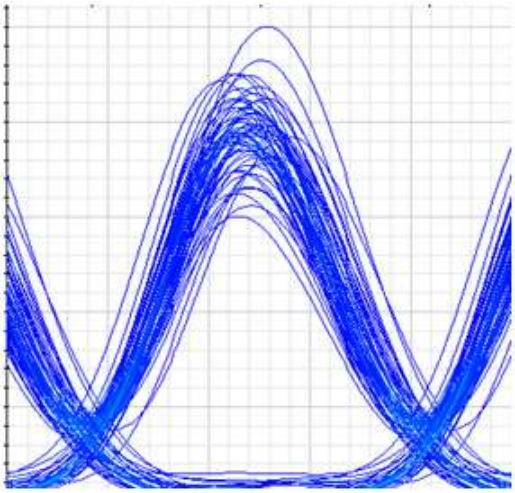
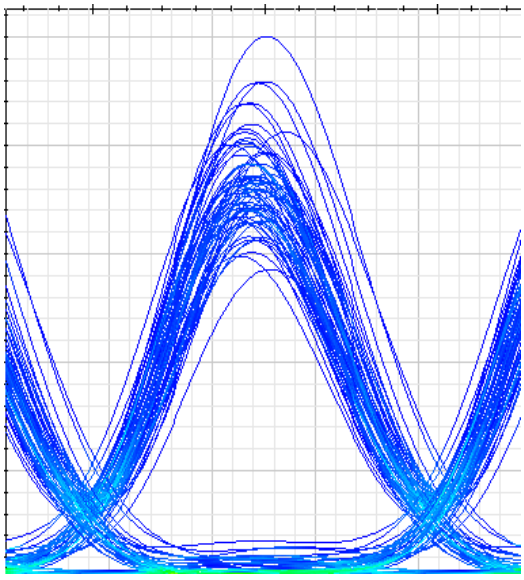


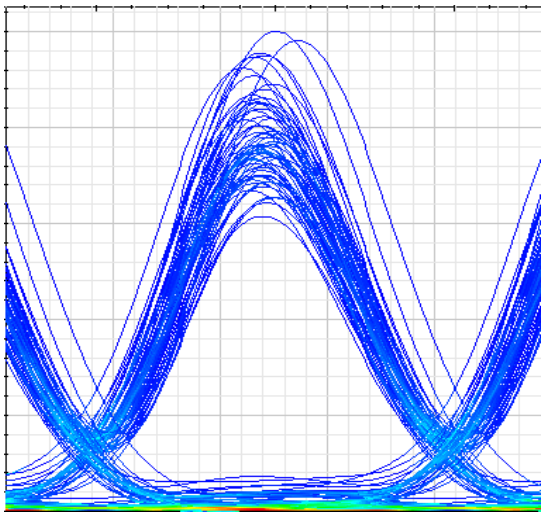
Fig.2 Graphical representation of quality factor and BER using varing bit rate



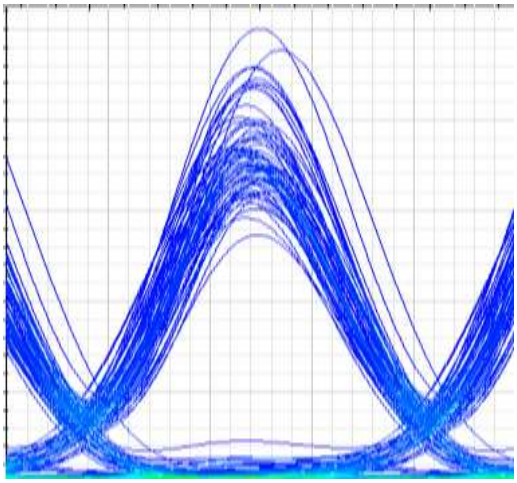
(i)Bit rate 40gbps,quality factor 9.06,BER4.91e-020



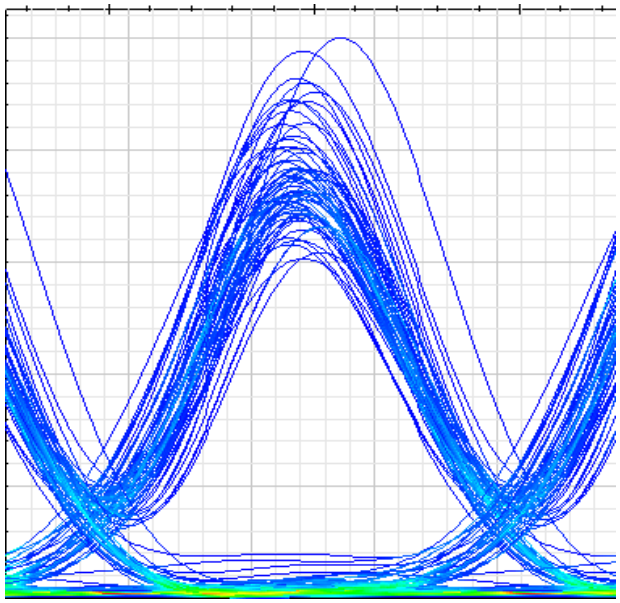
(ii)Bit rate 45gbps,quality factor 7.463,BER 3.52e-014



(iii)Bit rate 50gbps,quality factor 7.55 BER 1.67e-014



(iv)Bit rate 55gbps,quality factor 6.656,BER 1.08e-011



(v)Bit rate 60gbps,quality factor 7.45 BER 3.39e-014

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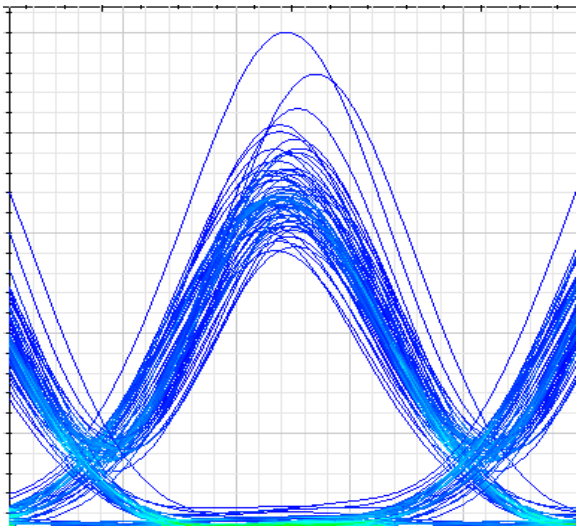
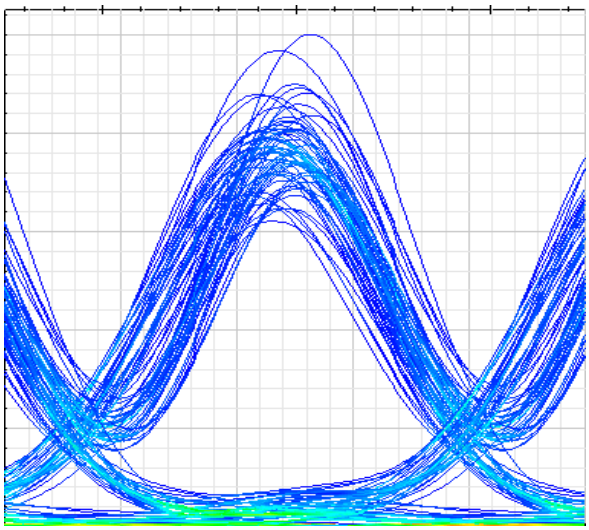
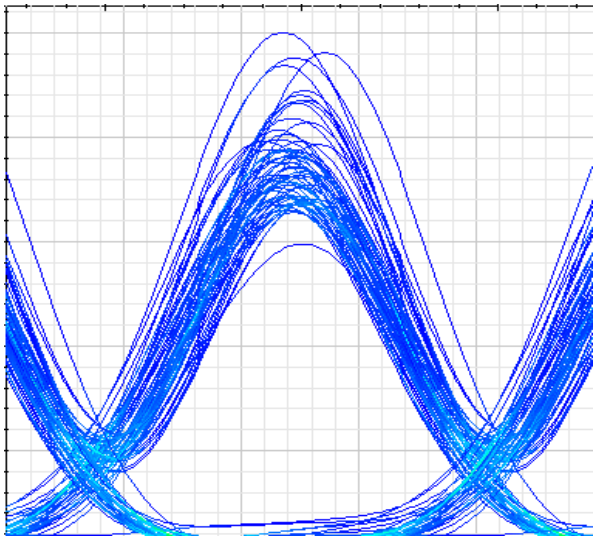


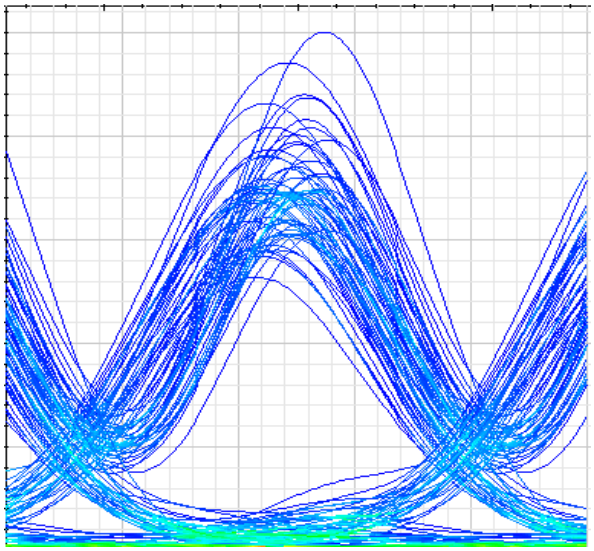
(vi)Bit rate 65gbps,quality factor 7.81 BER 2.07e-015



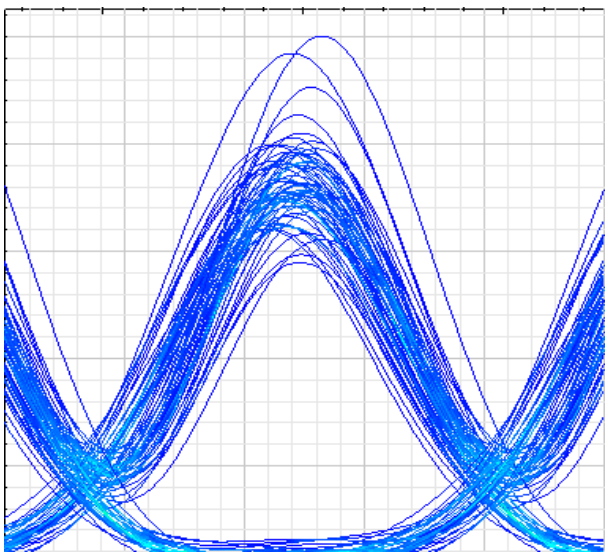
(ix)Bit rate 80gbps,quality factor 7.99,BER 5.38e-016



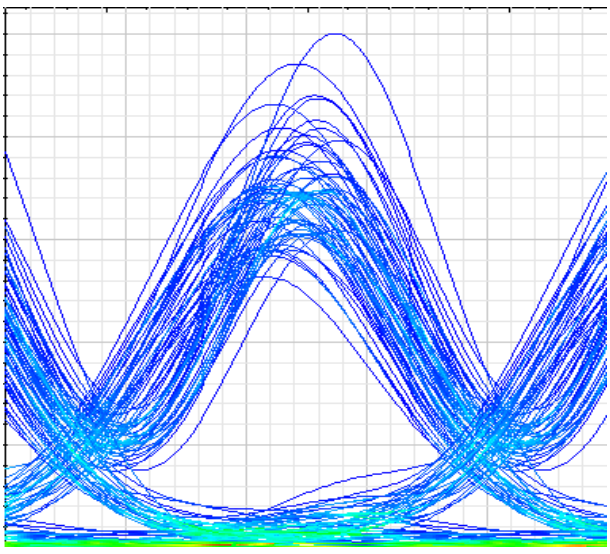
(vii)Bit rate 70gbps,quality factor 7.85 BER 1.46e-015



(x)Bit rate 85gbps, quality factor 6.20, BER 2.72e-010



(viii)Bit rate 75gbps,quality factor 7.99,BER 5.20e-16



(xi)Bit rate 90 gbps, quality factor 6.56, BER 2.34e-011

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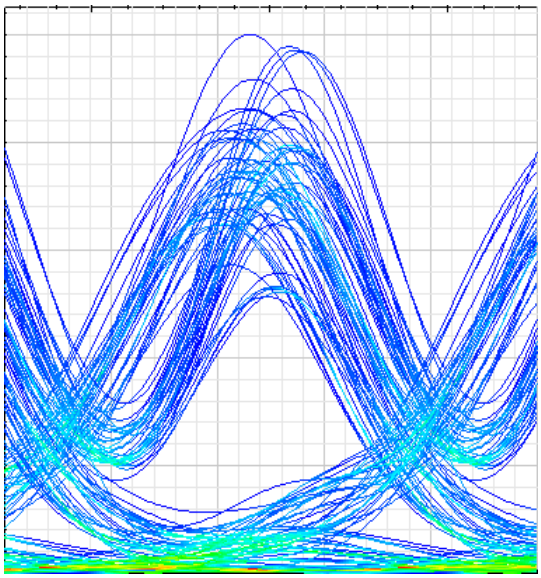
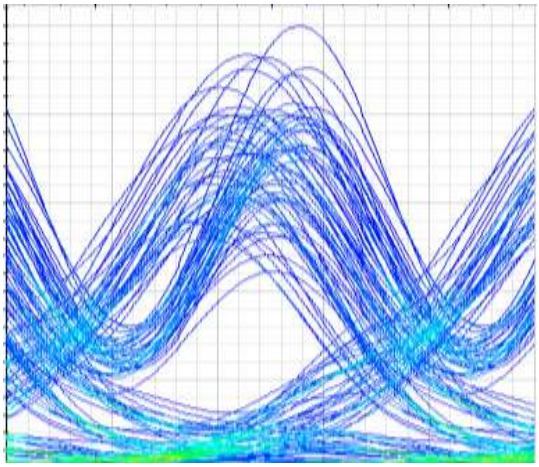


(xii)Bit rate 95 gbps, quality factor 4.77,BER 8.86e-007



(xiii)Bit rate 100gbps, quality factor 4.14,BER 1.44e-005

IV. CONCLUSION

To get the optimum result for light wave system we vary many parameter. in our research we vary bit rate 40 to 100gbps ,in which we conclude that upto 80gbps get better result without using any modulation technique.after this we did not get required result.if we did not use any modulation technique in that case our system complexity and cost are decease, and our system capacity enhanced.

V. REFERENCES

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