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☐ Soliton Transmission in Inhomogeneous Media with W-tailored Refractive index
(Title of paper. Capitalize only the first letter of each principal word.)

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Soliton transmission of optical pulses in nonlinear inhomogeneous media with W-tailored refractive index is modeled and parametrically analyzed. Two kinds of inhomogeneities are investigated for stable transmission in communications processes.

☐

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Soliton Transmission in Inhomogeneous Media with W-tailored Refractive Index
(Title of paper. Capitalize only the first letter of each principal word.)

Farag Z. El-Halafawy, El-Sayed A. El-Badawy*, Mohamed A. El-Gammal*, & Mostafa H. Aly
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Soliton transmission of optical pulses in nonlinear inhomogeneous media with W-tailored refractive index is modeled and parametrically analyzed.. Two kinds of inhomogeneities are simultaneously considered and investigated. The first of them is the biquadratic variation of the refractive index,

$$n(\alpha, m, \omega, r) = n(\omega)\left[1 - \alpha\left(\frac{r}{R}\right)^2 + \alpha m\left(\frac{r}{R}\right)^4\right]$$

where R is the fiber radius, α and m are tailoring parameters; the second is the boundary conditions of the cladded fiber. The balance between the nonlinearity and the dispersion effects creates a solitary wave. The dispersion effect results in a broadening of the pulse , while the nonlinearity tends to sharpen it. Takfng an average of the radial dependence, which is obtained under a simple series form, the wave equation is solved in the presence of the above mentioned inhomogeneities. The tailoring parameters of the refractive index have a remarkable influence on the existence of soliton solution, high bit rate, high group velocity, and minimum power to achieve a stable soliton transmission. The results showed that both the power and the group velocity possess respectively positive and negative correlations with the parameter α whatever the value of the parameter m. From the results it is found also that there is a threshold value α_{th} to achieve a stable soliton transmission which increases as the fiber radius increases. Finally, it is concluded that to design a W-tailored refractive index for stable light soliton transmission in a communication process(high bit rate, minimum power, and high group velocity), the parameter α must be tailored with minimum value, while the parameter m must be tailored with maximum value, whatever the type of dispersion.

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