

## عنوان مقاله:

Coherence characterization of a phase-locked partially coherent flat-topped array laser beam propagating through underwater turbulence

## محل انتشار:

کنفرانس بین المللی پژوهش در علوم و مهندسی (سال: 1395)

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## خلاصه مقاله:

In this research, based on an analytical expression for Cross-Spectral Density (CSD) matrix elements, coherence properties of phase-locked partially coherent flat-topped (PCFT) radial array laser beams propagating through propagating through the clear water turbulent ocean are explored. Due to the complicated nature of the oceanic turbulence spectrum, the analysis is restricted to numerical computations. The simulation is done by considering the effects of source parameters (such as radius of array setup's circle, effective width of the spectral degree of coherence and wavelength) and turbulent ocean factors (such as the rate of dissipation of the turbulent kinetic energy per unit mass of fluid,  $\epsilon$ , and relative strength of temperature and salinity fluctuations,  $N^2$ , Kolmogorov micro-scale,  $\eta$ , and rate of dissipation of the mean squared temperature,  $T$ ) in detail. Results indicate that, for off-axis propagation points, the spectral degree of coherence degrades to a minimum value (zero at far field) with decreasing in the values of  $\epsilon$  and alongside with the increasing in the value of  $T$ , which are corresponding to increase in the strength of oceanic turbulence. In addition, in oceanic media, PCFT array laser beam having the longer source's correlation length, flatness order and wavelength or a smaller radius of array setup's ring are found to be advantageous in the sense of slow degradation of the coherence degree at all propagation distances.

## کلمات کلیدی:

array laser beams, coherence; oceanic turbulence, underwater optical communication

## لینک ثابت مقاله در پایگاه سیویلیکا:

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