

Universal Fluctuations of Optimal Focusing Contrast through Random Media

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The contrast in optimal focusing through an opaque sample between the intensity at the focus and the background is equal to the eigenchannel participation number of the transmission matrix (TM), M . This can be expressed as $M \equiv (\sum_{n=1}^N \tau_n)^2 / \sum_{n=1}^N \tau_n^2$, where τ_n are the eigenvalues of the TM and N is the number of transmission eigenvalues. We will show that for diffusive waves the variance of M is independent of the sample length and disorder strength. We will discuss the impact of incomplete measurement of the TM on the statistics of τ_n , M and conductance.