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Optimized non-Gaussian communication strategies for a phase diffusion channel[1] MATT DIMARIO, University of New Mexico, LUDWIG KUNZ, KONRAD BANASZEK, University of Warsaw, ELOHIM BECERRA, University of New Mexico — Noise in realistic communication channels limits the amount of information that we can communicate. Many studies on how to maximize information transfer over noisy channels have focused on Gaussian noise. However, there are realistic situations in which communication takes place over a channel where the noise is not Gaussian. One such non-Gaussian channel is the phase diffusion channel, where optimal encoding and decoding methods and information rates are not known. However, optimized non-Gaussian communication strategies can potentially enhance information transfer beyond what is possible with conventional methods in this noisy channel. We demonstrate an optimized strategy for a phase diffusion channel which consists of a binary coherent state alphabet and a non-Gaussian measurement based on a coherent displacement of the input state followed by photon number resolving detection. In this optimized strategy, both the input state alphabet and measurement are optimized together to provide robustness and enhanced sensitivity for communications over noisy channel. We find that this optimized strategy achieves information transfer rates which surpass what is possible with conventional encoding and measurement methods for communications with binary coherent states.

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Matt DiMario
University of New Mexico

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