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**Optimized measurements of states of light at low powers for communications**

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Light is ideal for communications. We can use different properties of light to encode information, such as its phase, and send this information in light pulses to remote locations through optical fibers. Coherent states of light with different phases allow for efficient information transmission in communication. However, these states have intrinsic quantum noise, which sets fundamental limits on how well we can distinguish among different states. This fundamental property of coherent states can be exploited for enabling secure communication with quantum key distribution, but also generates errors in decoded information. We study measurements that can be optimized for distinguishing coherent states with different phases, which provide greater sensitivities than what could be achieved with our current conventional detectors at low powers. Such measurements could be used to increase the amount of information transfer, while being robust under loss and imperfections encountered in realistic communication links, such as in optical fibers.