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“Entanglement Generation in Green Fluorescent Protein”

Green Fluorescent Protein has had a profound impact on modern biology; it can be expressed by a wide variety of organisms, can be easily fused to other proteins, and emits green fluorescence with ~80% quantum efficiency when illuminated by blue light. Its strong interaction with light at the single photon level suggests that fluorescent protein may exhibit a  $\chi^{(3)}$  nonlinearity powerful enough to generate entangled photon pairs via four-wave mixing. If pair creation is observed, it is feasible that the quality and brightness of the resulting entangled pairs can be optimized via random mutagenesis. In other words, it may be possible to genetically engineer a source of photonic entanglement. I will discuss the first step towards this eventual goal, measuring the  $\chi^{(3)}$  nonlinearity of green fluorescent protein.