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## Quantum hypothesis testing for exoplanet detection

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Detecting the faint emission of a secondary source in the proximity of the much brighter one has been the most severe obstacle for using direct imaging in searching for exoplanets. Using quantum state discrimination and quantum imaging techniques, we show that one can significantly reduce the probability of error for detecting the presence of a weak secondary source, especially they are closely separated. If the weak source has intensity  $\epsilon \ll 1$  relative to the bright source, we find that the error exponent can be improved by a factor of  $1/\epsilon$ . We find linear-optical measurements optimal in this regime. Our result serves as a complementary method in the toolbox of imaging, with applications ranging from astronomy to microscopy.

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