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Paradox in Wave-Particle Duality for Non-Perturbative Measurements ERNST KNOESEL, Rowan University, EDUARDO FLORES, KEITH F. MCDONALD, SHARIAR S. AFSHAR — In a modified double-slit experiment we determined the complementary wave and particle aspect of light in the low flux regime beyond the limitations set by Bohr's Principle of Complementarity (BPC). We inferred the presence of sharp interference fringes, while we maintain, with very high probability, the information about the particular pinhole through which each individual photon had passed. This paradoxical result poses interesting questions on the validity of BPC in cases, which employ non-perturbative measurement techniques that evade Heisenberg's uncertainty principle and/or quantum entanglement.

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