

# Development of a Quantum Correlated SPDC Biphoton Source Using Frequency Selection and Low-Cost Diode Lasers

N W S OLIVEIRA<sup>1</sup>, A C A SIQUEIRA<sup>1</sup>, J FERRAZ<sup>2</sup>, AND D FELINTO<sup>1</sup>

<sup>1</sup>*Physics Department, Universidade Federal de Pernambuco, Recife, Brazil*

<sup>2</sup>*Physics Department, Universidade Federal Rural de Pernambuco, Recife, Brazil*

Contact Email: nallyson.william@ufpe.br

Entangled photons play a key role in fundamental quantum mechanics research, with several applications in quantum communication. Spontaneous Parametric Down Conversion (SPDC) has proven to be of great importance for developing sources of polarization-entangled photons. One of the most successful schemes for such sources uses the Sagnac interferometer around a PPKTP crystal, which is well-known for providing violations of Bell's inequalities. In this work, we propose an alternative scheme for a source of entangled photons based on frequency selection from a low-cost diode pump laser (409 nm). In our system, broadband photons are generated via SPDC directly in a PPKTP crystal and are split into two paths. After this, specific ranges of frequencies are selected in each path to isolate twin photons. Through measurements of the Cauchy-Schwarz inequality, we have observed highly non-classical behavior, validating the potential of our source of quantum-correlated photons.