Conditional preparation of a non-classical state of light in the continuous variable regime:

J. Laurat, T. Coudreau, A. Maître, and T. Coudreau are also at the Pôle Matériaux et Phénomènes Quantiques FR CNRS 2437, Université Denis Diderot, Paris coudreau@spectro.jussieu.fr.
N. Treps, A. Maître, C. Fabre Laboratoire Kastler Brossel, UPMC, Case 74, 4 Place Jussieu, 75252 Paris cedex 05, France

Received: 16 April 2003 / Revised version: 12 September 2003

abstract We report the first experimental demonstration of conditional preparation of a non-classical state of light in the continuous variable regime. Starting from a non-degenerate OPO which generates above threshold quantum intensity correlated signal and idler ”twin beams”, we keep the recorded values of the signal intensity only when the idler intensity falls inside a band of values narrower than its standard deviation. By this very simple technique, we generate a sub-Poissonian state 4.4 dB (64%) below shot noise from twin beams exhibiting 7.5 dB (82%) of noise reduction in the intensity difference.