Quantum analysis of nonlinear beam splitter with second order nonlinearity. HARI PRAKASH, Physics Department, University of Allahabad, Allahabad-211002, India and M N Saha Center of Space Studies, IIDS, University of Allahabad, Allahabad, DEVENDRA KUMAR MISHRA, Physics Department, University of Allahabad, Allahabad-211002, India and V. S. Mehta College of Science, Bharwari, Kaushambi-212201, U. P., India — A linear beam splitter mixes two input modes having annihilation operators $\hat{a}$ and $\hat{b}$ and generate two output modes having annihilation operators $\hat{c}$ and $\hat{d}$, which are linear in $\hat{a}$ and $\hat{b}$ and may be written as $\hat{c} = t\hat{a} + ir\hat{b}$ and $\hat{d} = t\hat{b} + ir\hat{a}$, where t and r are the real coefficients of transmission and reflection, respectively, with $r^2 + t^2 = 1$. We include the second order nonlinearity and as a result we find generation of second- harmonic non-classical light. If two coherent beams are mixed at input, squeezing and sub-Poissonian photon statistics are seen to be exhibited by the second-harmonic output beam.

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