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Double Stokes-Mueller polarimetry in KTP (Potassium Titanyl Phosphate) crystal CHITRA SHAJI, SRUTHIL LAL S B, ALOK SHARAN, Department of Physics, Pondicherry University, Puducherry — Ultra-structural properties of material are being probed by Double Stokes-Mueller polarimetry (DSMP) technique. It makes use of higher dimensions of Stokes vector (9 X 1) and Mueller matrix (4 X9) to characterize the nonlinear optical properties of a material. Second harmonic generation (SHG) at 532nm using 1064nm as fundamental cw beam from Nd: YAG laser in type II phase matched KTP (Potassium Titanyl Phosphate) crystal is studied using DSMP. The experimental measurements for determining double Mueller matrix are carried out in the Polarization In Polarization Out (PIPO) arrangement. Nine input polarization states are incident on the sample and the linear Stokes vector of the emerging light from the sample is measured. The KTP crystal is oriented such that the SHG signal efficiency at the incident horizontal and vertical polarizations is high as compared to diagonal polarization states. The susceptibility tensor components and the phase difference between them at this orientation are determined from the double Mueller matrix elements. These determined values give information regarding the crystal axis orientations. To our knowledge, this is the first report of the use of DSMP technique to determine the crystal orientations of a biaxial crystal.

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