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Anomalous Stokes scattering by an atomic ensemble: detection of entanglement and vector metrology of field gradient[1] WANG YAO, HONGYI YU, Department of Physics and Center for Theoretical and Computational Physics, The University of Hong Kong — We investigate the collective Stokes scattering by a typical atomic cloud, i.e. with size much larger than the light wavelength and with density much lower than that required for Dicke superradiance. We show that the diffraction pattern of the Stokes photon can be used to detect entanglement in the atomic ensemble. When the atomic cloud is placed in a static magnetic field or electric field, the change of diffraction pattern by the evolution in the field can also provide sensitive vector metrology of the spatial gradient of the field.

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