

Holography, and in particular, digital holography, has numerous applications in optical metrology, interferometry, 3D imaging, etc. In traditional holography, the interference pattern of the object and the reference is recorded at a certain distance from the object, and reconstruction using a reading beam optically or numerically yields its phase or depth profile. Alternatively, a noninterferometric method can be used, this entails recording optical intensities from only the object at different distances of propagation. Transport of intensity, as this latter technique is called, uses the imaginary part of the complex paraxial wave equation and is equivalent to the principle of conservation of energy. In this talk, applications of both interferometric and noninterferometric methods will be demonstrated. Examples include the reconstruction of the 3D shape of surfaces, fingerprint visualization, and reconstruction of the 3D phase profile during self-phase modulation of a laser beam.