

(54) Title of the invention : DIGITAL HOLOGRAPHIC NANOSCOPIC SYSTEM FOR 3-D SUPER-RESOLUTION IMAGING OF REFLECTIVE SURFACE, DEFECTS AND CRACKS

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(71)Name of Applicant :

1)INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD

Address of Applicant :Dhanbad - 826004, Jharkhand, India
Dhanbad -----

Name of Applicant : NA

Address of Applicant : NA

(72)Name of Inventor :

1)Anil Kumar Nirala

Address of Applicant :Department of Physics, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad – 826004, Jharkhand, India Dhanbad -----

2)Atul Kumar

Address of Applicant :Department of Physics, Indian Institute of Technology (Indian School of Mines), Dhanbad, Dhanbad – 826004, Jharkhand, India Dhanbad -----

(57) Abstract :

The present invention relates to a digital holographic nanoscopic system for three-dimensional super resolution imaging of the reflective surface topography, defects, and cracks, based on Mach-Zehnder and Linnik configuration. The digital image processing tools based on deep learning have been used for imaging beyond the diffraction limit. The system comprises a light source (1), a beam splitter (2, 2'), an interferometer (100, 100') comprising a plurality of microscope objectives (3, 3', 6, 6', 9, 9') where object (O) and reference (R) diverging wavefront superpose to create an interference pattern. This interference pattern consists of all the phase and amplitude information about the object, which is further magnified to a higher value. A CCD sensor (11) captures this information and store in a PC for further processing. The proposed systems exhibit axial resolution of (2-2.5) nm and lateral resolution of (90-100) nm with magnification of ~1,20,000 times.

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