

Claims

1. A system for optical three-dimensional topography measurement of a surface of an object, the system comprising:

a source of patterned illumination;

a source of uniform illumination;

an objective, arranged to direct both the patterned illumination and the uniform illumination to the surface of the object;

a detector arranged and configured for recording a plurality of images of the surface of the object through the objective;

a first beam splitter arranged to combine the patterned illumination and the uniform illumination to form a combined illumination path; a second beam splitter arranged in such a way that an imaging path between the objective and the detector and the combined illumination path between the first beam splitter and the objective pass through the second beam splitter, wherein the combined illumination path is received at the second beam splitter directly from the first beam splitter; wherein the objective is positioned to correct diffraction caused by the beam splitter and

a computer connected to the detector that is configured to determine height information for a position on the surface of the object based on differences in light intensity of the plurality of images, wherein the light intensity changes along a direction including at least a component along an optical axis of the objective.

2. The system of claim 1, wherein the source of patterned illumination includes a light source and a pattern mask.

3. The system of claim 2, wherein the pattern mask has a checkerboard pattern or a pinhole array.

4. The system of claim 2, wherein the pattern mask is a grating.

5. The system of claim 4, wherein the grating is an amplitude grating or a phase grating.

6. The system of claim 4, wherein the grating is a line grating or a sinusoidal grating or a cross-line grating.

7. The system of claim 4, wherein the grating is a blazed grating.

8. The system of claim 2, wherein the pattern mask and the detector are in conjugate planes.

9. The system of claim 1, wherein a direction of the relative movement between the object and the objective is parallel to the optical axis of the objective.