

Claims

1. A combination detector (16) for detecting at least one visually recognizable property (d, r, o, t) and at least one optical property (s, z) of an optical system (22), comprising an image sensor (26) having a detection surface (28) and comprising a phase visualization element (30) configured to convert an input light beam (20") impinging from a direction (24) of incidence into one or more output light beams (42), in which a spatial phase distribution of the input light beam (20") is visually visible, wherein the phase visualization element (30) is arranged relative to the detection surface (28) of the image sensor (26) in such a way that the output light beam or the output light beams (42) is/are incident only on a first partial region (38) of the detection surface (28), while a second partial region (40) of the detection surface (28) is exposed toward the direction (24) of incidence in order to detect the input light beam (20") which is uninfluenced by the phase visualization element (30).
2. The combination detector (16) as claimed in claim 1, wherein the phase visualization element (30) comprises a microlens array (32), a perforated plate, an interference grating or a shearing interferometer.
3. The combination detector (16) as claimed in claim 1 or 2, wherein the first partial region (38) and the second partial region (40) are arranged concentrically with respect to one another.

4. The combination detector (16) as claimed in any of claims 1 to 3,
wherein the phase visualization element (30) is fixed, in particular screwed, clamped or adhesively bonded, directly in front of or on the detection surface (28) of the image sensor (26).
5. The combination detector (16) as claimed in any of claims 1 to 4,
wherein the image sensor (26) is a CCD chip or a photodiode array.
6. An apparatus (2) for testing an optical system (22), comprising a light source (4) for generating a measurement light beam (20) and comprising a combination detector (16) as claimed in any of claims 1 to 5.
7. The apparatus (2) as claimed in claim 6,
comprising a sample holder (8) for fixing the optical system (22) to be tested, said sample holder being arranged in a beam path of the measurement light beam (20) between the light source (4) and the combination detector (16).
8. The apparatus 2 as claimed in claim 6 or 7,
comprising an optical element (72) for matching the optical path lengths of that part of the input light beam (20") which impinges on the phase visualization element (30) and that part of the input light beam (20") which impinges on the second partial region (40) of the detection surface (28).

9. The apparatus (2) as claimed in any of claims 6 to 8,
comprising an evaluation unit (18) for evaluating an
image (44) of the optical system (22) to be tested,
said image being recorded by the image sensor (26),
wherein the image (44) has a first image region (46)
corresponding to the first partial region (38) of
the detection surface (28) and a second image region
(48) corresponding to the second partial region (40)
of the detection surface (28),
- wherein the evaluation unit (18) is designed to
automatically ascertain at least one optical
property (s, z) of the optical system (22) to be
tested from the first image region (46), and/or
- wherein the evaluation unit (18) is designed to
automatically ascertain at least one visually
recognizable property (d, r, o, t) of the optical
system (22) to be tested from the second image
region (48).
10. The apparatus (2) as claimed in claim 9,
wherein the evaluation unit (18) is designed to
automatically recognize and segment the first image
region (46) and the second image region (48) in the
image (44).
11. The use of the apparatus (2) as claimed in any of
claims 6 to 10 for testing contact lenses (22) or
intraocular lenses.

12. A method for detecting at least one visually recognizable property (d, r, o, t) and at least one optical property (s, z) of an optical system (22),
- wherein a first partial image (58) is generated by means of an image sensor (26) and an upstream phase visualization element (30), in which first partial image a spatial phase distribution of a measurement light beam (20") influenced by the optical system (22) to be tested is made visually recognizable,
 - wherein a second partial image (60) containing an imaging or projection of a part of the optical system (22) to be tested is generated by means of the image sensor (26) and is uninfluenced by the phase visualization element (30),
 - wherein the at least one optical property (s, z) is ascertained from the first partial image (58), and
 - wherein the at least one visually recognizable property (d, r, o, t) is ascertained from the second partial image (58).