CLAIMS

1. A device for the interferometric measuring of an object (10), comprising a radiation source (1) to generate a source beam (3), a beam splitting device (2) to split the source beam (3) into a measuring beam and a reference beam (4, 5), an optic interference device, and a first detector (6), with the interference device and the first detector (6) are embodied cooperating such that the measuring beam (4), at least partially reflected by the object, is at least partially interfered as the receiver beam (4b) and the reference beam (5) on at least one detector area of the first detector (6),
characterized in that

the beam splitter device is embodied to split the source beam (3) into a measuring beam (4), a first partial reference beam (5.1), and at least one second partial reference beam (5.2) and for splitting the receiver beam (4b) into a first partial receiver beam (4.1b) and at least a second partial receiver beam (4.2b), that the device comprises at least one second detector (13) and is embodied such that the first receiver beam (4b) is interfered with the first partial reference beam (5.1) on a detection area of the first detector (6) and the second partial receiver beam (4.2b) with the second partial reference beam (5.2) is interfered on a detection area of the second detector (13), here respectively forming an optic interference, and that the device comprises an assessment unit to evaluate the measuring signals of the first and the second detector (6, 13), which is embodied to evaluate the measuring signals of the two detectors according to the principles of reception diversity.

2. A device according to claim 1,
characterized in that

the device comprises at least one optic beam splitting means, which is arranged in the radiation path of the receiver beam (4b) and/or the first and/or the second partial receiver beam (4.1b, 4.2b) and is embodied such that different polarization

portions and/or different beam cross-sectional portions and/or different modes of the receiver beam (4b) can be assessed with the first and the second detector.

3. A device according to one of the previous claims,
characterized in that

the beam splitting device comprises a polarization means (12), which is embodied such that via the first and the second detector (6, 13) portions of the receiver beam (4b), orthogonally polarized in reference to each other, can be evaluated, particularly linear polarization portions aligned perpendicular in reference to each other or oppositely circular polarization portions.

4. A device according to one of the previous claims,
characterized in that

the polarization means (12) comprises a polarization beam splitter, which is arranged in the radiation path of the receiver beam (4b) so that the receiver beam is split into the first partial receiver beam (4.1b) and the second partial receiver beam (4.2b) and the first and the second partial receiver beam comprise different polarization components of the receiver beam.

5. A device according to claim 4,
characterized in that

the polarization beam splitter is additionally arranged in the radiation path of the reference beam (5) so that via the polarization beam splitter the reference beam is split into the first and the second partial reference beam (5.1, 5.2).

6. A device according to one of the previous claims,
characterized in that

the axes of the optic beam of the collimated transmitter beam and the receiver beam (4a, 4b) are located parallel and over top of each other at least between the beam output of the device and the object (10).

7. A device according to one of claims 1 to 5,
characterized in that

the axes of the optic beam of the collimated transmitter and receiver beam (4a, 4b) are located side-by-side, spatially separated preferably parallel next to each other, at least between a beam outlet of the device and the object (10).

8. A device according to one of the previous claims,
characterized in that

the device comprises a signal processing unit, which signal processing unit is embodied to generate a combined output signal from the measuring data of the first and the second detector, preferably by a weighed addition of the measuring signals of the first and the second detector, preferably by weighing dependent on the signal strengths of the measuring signal of the first and the second detector (6, 13).

9. A device according to one of the previous claims,
characterized in that

in the radiation path of the measuring beam and the receiver beam a transceiver lens is arranged, particularly that the axes of the measuring beam and the receiver beam penetrate an aperture of the transceiver lens parallel and spatially separated, preferably that the beam intensity profile of the measuring beam and/or the receiver beam, preferably both beams, is formed such that the aperture of the transceiver lens is used predominantly, particularly that the beam intensity profile of the measuring beam and/or the receiver beam, preferably both beams, is embodied elliptical with an axial ratio ranging from 1:1.5 to 1:2.5.

10. A method for the interferometric measuring of an object (10) comprising the following processing steps:

- generating an output beam via a radiation source (1);
- splitting the output beam into at least one measuring beam and at least one reference beam (4, 5);

- impinging at least one measuring point on the object (10) with the measuring beam (4) as the transmitter beam (4a), and
- interfering the measuring beam (4), at least partially reflected and/or dispersed by the object (10) as a receiver beam (4b), with the reference beam (5) on a detection area of a first detector (6), forming an optic interference;

characterized in that the source beam (3) is split into a measuring beam (4), a first partial reference beam (5.1), and at least one second partial reference beam (5.2) and the receiver beam into a first partial receiver beam (4.1b) and at least a second partial receiver beam (4.2b), that the first partial receiver beam (4.1b) is interfered with the first partial reference beam (5.1) on the detection area of the first detector (6) and the second partial receiver beam (4.2b) with a second partial reference beam (5.2) on a detection area of a second detector (13), each with the formation of an optic interference, and that the measuring signals of the first and the second detector (6, 13) are assessed according to the principle of the reception diversity.

11. A method according to claim 10,
characterized in that

via the first detector (6) different polarization portions and/or different beam cross-sectional portions and/or different modes of the receiver beam are measured in reference to the second detector (13).

12. A method according to one of claims 10 to 11,
characterized in that

an assessment of the measuring signals of the two detectors (6, 13) occurs such that a combined measuring signal is formed from the measuring signals of the two detectors, with a weighed adding of the first and the second measuring signal occurs, preferably under the consideration of the power and/or the amplitude of the measuring signal.

13. A method according to one of claims 10 to 12,

characterized in that

for the first measuring signal a first weighing factor and for the second measuring signal a second weighing factor is formed, which weighing factors are complementary to each other and are each formed dependent on the first and the second measuring signal, preferably the amplitude of the first and the second measuring signal, particularly that the weighing factors are formed such that respectively the measuring signal with the greater amplitude is weighed by 100% and the measuring signal with the lower amplitude by 0% or that the weighing occurs linearly according to the ratio of the amplitudes.

14. A method according to one of claims 10 to 13,
characterized in that

the polarization state of the measuring beam and/or the receiver beam are influenced by an optic means such that receiver channels of both detectors (6, 13) show essentially the same signal strength during the measuring of a metallic reflective object, particularly that an optic means is used comprising an optic delay plate.

CLAIMS

1. A device for the interferometric measuring of an object (10), comprising a radiation source (1) to generate a source beam (3), a beam splitting device (2) to split the source beam (3) into a measuring beam and a reference beam (4, 5), an optic interference device which comprises at least the beam splitting device (2), and a first detector (6), with the interference device and the first detector (6) are embodied cooperating such that the measuring beam (4), at least partially reflected by the object, is at least partially interfered as a receiver beam (4b) and the reference beam (5) on at least one detector area of the first detector (6),
characterized in that

the beam splitting device (2) is embodied to split the source beam (3) into a measuring beam (4), a first partial reference beam (5.1), and at least one second partial reference beam (5.2) and for splitting the receiver beam (4b) into a first partial receiver beam (4.1b) and at least a second partial receiver beam (4.2b), that the device comprises at least one second detector (13) and is embodied such that the first receiver beam (4b) is interfered with the first partial reference beam (5.1) on a detection area of the first detector (6) and the second partial receiver beam (4.2b) with the second partial reference beam (5.2) is interfered on a detection area of the second detector (13), here respectively forming an optic interference, and that the device comprises an assessment unit to evaluate the measuring signals of the first and the second detector (6, 13), which is embodied to evaluate the measuring signals of the two detectors (6, 13) according to the principles of reception diversity, in that an assessment occurs based on a quality criterion which allows an assessment of the quality of the measuring data of the first detector (6) and reference to the quality of the measuring data of the second detector (13), which dependent on the respectively determined quality values comprises either only one measuring signal of one of the detectors (6, 13) or a combined measuring signal of both detectors (6, 13), with here the above-mentioned combination may also include a weighing dependent on the quality applied.

2. A device according to claim 1,
characterized in that

the device comprises in addition to the beam splitting device (2) at least one optic beam splitting means, which is arranged in the radiation path of the receiver beam (4b) and/or the first and/or the second partial receiver beam (4.1b, 4.2b) and is embodied such that different

polarization portions and/or different beam cross-sectional portions and/or different modes of the receiver beam (4b) can be assessed with the first and the second detector (6, 13).

3. A device according to one of the previous claims,
characterized in that

the beam splitting device (2) comprises a polarization means (12), which is embodied such that via the first and the second detector (6, 13) portions of the receiver beam (4b), orthogonally polarized in reference to each other, can be evaluated, particularly linear polarization portions aligned perpendicular in reference to each other or oppositely circular polarization portions.

4. A device according to claim 3,
characterized in that

the polarization means (12) comprises a polarization beam splitter, which is arranged in the radiation path of the receiver beam (4b) so that the receiver beam (4b) is split into the first partial receiver beam (4.1b) and the second partial receiver beam (4.2b) and the first and the second partial receiver beam (4.1b, 4.2b) comprise different polarization components of the receiver beam (4b).

5. A device according to claim 4,
characterized in that

the polarization beam splitter is additionally arranged in the radiation path of the reference beam (5) so that via the polarization beam splitter the reference beam (5) is split into the first and the second partial reference beam (5.1, 5.2).

6. A device according to one of the previous claims,
characterized in that

the axes of the optic beam of the collimated transmitter beam and the receiver beam (4a, 4b) are located parallel and over top of each other at least between the beam output of the device and the object (10).

7. A device according to one of claims 1 to 5,
characterized in that

the axes of the optic beam of the collimated transmitter and receiver beam (4a, 4b) are located side-by-side, spatially separated preferably parallel next to each other, at least between a beam outlet of the device and the object (10).

8. A device according to one of the previous claims,
characterized in that

the device comprises a signal processing unit, which signal processing unit is embodied to generate a combined output signal from the measuring data of the first and the second detector (6, 13), preferably by a weighed addition of the measuring signals of the first and the second detector (6, 13), preferably by weighing dependent on the signal strengths of the measuring signal of the first and the second detector (6, 13).

9. A device according to one of the previous claims,
characterized in that

in the radiation path of the measuring beam (4) and the receiver beam (4b) a transceiver lens is arranged, particularly that the axes of the measuring beam (4) and the receiver beam (4b) penetrate an aperture of the transceiver lens parallel and spatially separated, preferably that the beam intensity profile of the measuring beam (4) and/or the receiver beam (4b), preferably both beams, is formed such that the aperture of the transceiver lens is used predominantly, particularly that the beam intensity profile of the measuring beam and/or the receiver beam, preferably both beams, is embodied elliptical with an axial ratio ranging from 1:1.5 to 1:2.5.

10. A method for the interferometric measuring of an object (10) comprising the following processing steps:

- generating an output beam via a radiation source (1);
- splitting the output beam into at least one measuring beam and at least one reference beam (4, 5);
- impinging at least one measuring point on the object (10) with the measuring beam (4) as the transmitter beam (4a), and
- interfering the measuring beam (4), at least partially reflected and/or dispersed by the object (10) as a receiver beam (4b), with the reference beam (5) on a detection area of a first detector (6), forming an optic interference;

characterized in that the source beam (3) is split into a measuring beam (4), a first partial reference beam (5.1), and at least one second partial reference beam (5.2) and the receiver beam into a first partial receiver beam (4.1b) and at least a second partial receiver beam (4.2b), that the first partial receiver beam (4.1b) is interfered with the first partial reference beam (5.1) on the detection area of the first detector (6) and the second partial receiver beam (4.2b) with a second partial reference beam (5.2) on a detection area of a second detector (13), each with the formation of an optic interference, and that the measuring signals of the first and the second detector (6, 13) are assessed according to the principle of the reception diversity, in that an assessment occurs based on a quality criterion which allows an assessment of the quality of the measuring data of the first detector (6) and reference to the quality of the measuring data of the second detector (13), which dependent on the respectively determined quality values comprises either only one measuring signal of one of the detectors (6, 13) or a combined measuring signal of both detectors (6, 13), with here the above-mentioned combination may also include a weighing dependent on the quality applied.

11. A method according to claim 10,
characterized in that

via the first detector (6) different polarization portions and/or different beam cross-sectional portions and/or different modes of the receiver beam are measured in reference to the second detector (13).

12. A method according to one of claims 10 to 11,
characterized in that

an assessment of the measuring signals of the two detectors (6, 13) occurs such that a combined measuring signal is formed from the measuring signals of the two detectors (6, 13), with a weighed adding of the first and the second measuring signal occurs, preferably under the consideration of the power and/or the amplitude of the measuring signal.

13. A method according to one of claims 10 to 12,
characterized in that

for the first measuring signal a first weighing factor and for the second measuring signal a second weighing factor is formed, which weighing factors are complementary to each other and are each formed dependent on the first and the second measuring signal, preferably the amplitude of the first and the second measuring signal, particularly that the weighing factors

are formed such that respectively the measuring signal with the greater amplitude is weighed by 100% and the measuring signal with the lower amplitude by 0% or that the weighing occurs linearly according to the ratio of the amplitudes.

14. A method according to one of claims 10 to 13,
characterized in that

the polarization state of the measuring beam (4) and/or the receiver beam (4b) are influenced by an optic means such that receiver channels of both detectors (6, 13) show essentially the same signal strength during the measuring of a metallic reflective object, particularly that an optic means is used comprising an optic delay plate.