CLAIMS

1. An optical sensor for sensing at least one parameter comprising:

an optical source configured to provide a source optical signal and a reference spectral profile; and

a grating arrangement optically coupled to the optical source to receive the source optical signal, the grating arrangement comprising:

a first chirped fiber Bragg grating (FBG) having a first defined spectral profile,

wherein the first defined spectral profile overlaps with a portion of the reference spectral profile,

wherein the first chirped FBG is configured, in response to a first change in the at least one parameter interacting with the first chirped FBG, to change from an original state to a first state to shift the first defined spectral profile in a first direction relative to the reference spectral profile, and further configured, in response to the first defined spectral profile being shifted in the first direction, to transmit a first portion of the source optical signal as a first output optical signal corresponding to the first change, wherein a first intensity of the first output optical signal is indicative of the first change, and

wherein the first chirped FBG is configured, in response to a second change in the at least one parameter interacting with the first chirped FBG, to change from the original state to a second state to shift the first defined spectral profile in a second direction relative to the reference spectral profile, and further configured, in response to the first defined spectral profile being shifted in the second direction, to transmit a second portion of the source optical signal as a second output optical signal corresponding to the second change, wherein a second intensity of the second output optical signal is indicative of the second change; and

a second chirped FBG having a second defined spectral profile,

wherein the second defined spectral profile overlaps with a portion of the reference spectral profile,

wherein the second chirped FBG is configured, in response to a third change in a parameter interacting with the second chirped FBG, to change from an original state to a third state to shift the second defined spectral profile in a third direction relative to the reference spectral profile, and further configured, in response to the second defined spectral profile being shifted in the third direction, to transmit a third portion of the source optical signal as a third output optical signal corresponding to the third change, wherein a third intensity of the third output optical signal is indicative of the third change, and

wherein the second chirped FBG is configured, in response to a fourth change in the parameter interacting with the second chirped FBG, to change from the original state to a fourth state to shift the second defined spectral profile in a fourth direction relative to the reference spectral profile, and further configured, in response to the second defined spectral profile being shifted in the fourth direction, to transmit a fourth portion of the source optical signal as a fourth output optical signal corresponding to the fourth change, wherein a fourth intensity of the fourth output optical signal is indicative of the fourth change.

2. The optical sensor as claimed in claim 1, further comprising a photodetector configured to receive the first output optical signal and the second output optical signal.

3. The optical sensor as claimed in claim 2, further comprising a second photodetector configured to receive the third output optical signal and the fourth output optical signal.

4. The optical sensor as claimed in claim 1, wherein the optical source comprises a superluminescent diode or a light emitting diode.

5. The optical sensor as claimed in claim 1, further comprising at least one fiber coupler arranged to optically couple the optical source to the grating arrangement.

6. The optical sensor as claimed in in claim 1, further comprising a wireless module.

7. A sensor arrangement comprising:

a plurality of optical sensors, wherein at least one optical sensor of the plurality of optical sensors is as claimed in claim 6; and

a wireless communication unit configured to communicate with the wireless module.

8. The optical sensor as claimed in in claim 1, further comprising a processor.

9. A sensor arrangement comprising a plurality of optical sensors, wherein at least one optical sensor of the plurality of optical sensors is as claimed in claim 1.

10. An optical sensor for sensing at least one parameter comprising:

an optical source configured to provide a source optical signal and a reference spectral profile; and

a grating arrangement optically coupled to the optical source to receive the source optical signal, the grating arrangement comprising:

a first chirped fiber Bragg grating (FBG) having a first defined spectral profile,

wherein the first defined spectral profile overlaps with a portion of the reference spectral profile,

wherein the first chirped FBG is configured, in response to a first change in the at least one parameter interacting with the first chirped FBG, to change from an original state to a first state to shift the first defined spectral profile in a first direction relative to the reference spectral profile, and further configured, in response to the first defined spectral profile being shifted in the first direction, to transmit a first

portion of the source optical signal as a first output optical signal corresponding to the first change, and

wherein the first chirped FBG is configured, in response to a second change in the at least one parameter interacting with the first chirped FBG, to change from the original state to a second state to shift the first defined spectral profile in a second direction relative to the reference spectral profile, and further configured, in response to the first defined spectral profile being shifted in the second direction, to transmit a second portion of the source optical signal as a second output optical signal corresponding to the second change; and

a second chirped FBG having a second defined spectral profile,

wherein the second defined spectral profile overlaps with a portion of the reference spectral profile,

wherein the second chirped FBG is configured, in response to a third change in a parameter interacting with the second chirped FBG, to change from an original state to a third state to shift the second defined spectral profile in a third direction relative to the reference spectral profile, and further configured, in response to the second defined spectral profile being shifted in the third direction, to transmit a third portion of the source optical signal as a third output optical signal corresponding to the third change, and

wherein the second chirped FBG is configured, in response to a fourth change in the parameter interacting with the second chirped FBG, to change from the original state to a fourth state to shift the second defined spectral profile in a fourth direction relative to the reference spectral profile, and further configured, in response to the second defined spectral profile being shifted in the fourth direction, to transmit a fourth portion of the source optical signal as a fourth output optical signal corresponding to the fourth change.

11. The optical sensor as claimed in claim 10, further comprising:

a first photodetector configured to receive the first output optical signal and the second output optical signal, and

a second photodetector configured to receive the third output optical signal and the fourth output optical signal.

12. A sensor arrangement comprising a plurality of optical sensors, wherein at least one optical sensor of the plurality of optical sensors is as claimed in claim 10.