configured to receive the excitation light for generating an oscillating strain, wherein the oscillating strain generates an acoustic wave in the structure; and a detector configured to detect the acoustic wave, wherein the at least one excitation element has a resonance frequency based on at least one of a shape, a pattern and a dimension of the at least one excitation element; and wherein the excitation light is modulated at a modulation frequency matching the resonance frequency of the at least one excitation element.

[006] The excitation light may be modulated based on a light intensity.

[007] The excitation light may be modulated based on an optical polarization.

[008] The photostrictive material may comprise a ferroelectric material.

[009]

[0010]

[0011] The system may comprise a plurality of excitation elements and the plurality of excitation elements may be attached to the surface of the structure based on a pre-defined pattern.

[0012] The pre-defined pattern may comprise a periodicity, and the excitation light may be modulated at a modulation frequency based on the periodicity of the pre-defined pattern.

[0013] The pre-defined pattern may comprise an orientation, and a direction of propagation of the acoustic wave may be defined by the orientation of the pre-defined pattern.

[0014] The at least one excitation element may comprise a cantilever.

[0015] The acoustic wave may be an ultrasonic wave with frequency above 20 kHz.

[0016] The detector may comprise a non-contact sensor.

[0017] The detector may comprise a contact sensor disposed on the surface of the structure.

[0018] According to a second aspect, there is provided a non-destructive testing system comprising the system as described above.

[0019] According to a third aspect, there is provided a structural health monitoring system comprising the system as described above.

[0020] According to a fourth aspect, there is provided a method for detecting an anomaly in a structure, the method comprising: attaching at least one excitation element to a surface of the structure, the at least one excitation element comprising a photostrictive material, wherein the at least one excitation element has a resonance frequency based on at least one of a shape, a pattern and a dimension of the at least one excitation element; emitting, by a light source, an excitation light onto the at least one excitation element such that an oscillating strain is generated in the at least one excitation element, wherein the oscillating strain generates an acoustic wave in the structure; modulating the excitation light at a modulation frequency matching the resonance frequency of the at least one excitation element; and detecting, by a detector, the acoustic wave for detecting an anomaly in the structure.

[0021] The method may further comprise modulating the excitation light based on a light intensity.

[0022] The method may further comprise modulating the excitation light based on an optical polarization.

[0023] The photostrictive material may comprise a ferroelectric material.

[0024]

[0025]

[0026] The method may comprise attaching a plurality of excitation elements to the surface of the structure based on a pre-defined pattern.

[0027] The pre-defined pattern may comprise a periodicity, and the method may further comprise modulating the excitation light at a modulation frequency based on the periodicity of pre-defined pattern.

[0028] The pre-defined pattern may comprise an orientation, and detecting the acoustic wave may comprise detecting along a direction of propagation of the acoustic wave defined by the orientation of the pre-defined pattern.

[0029] The detector may comprise a non-contact sensor.

[0030] The detector may comprise a contact sensor disposed on the surface of the structure.

[0031] According to a fifth aspect, there is provided a non-destructive testing method comprising the method as described above.

CLAIMS

1. A system comprising:

a light source configured to emit an excitation light;

at least one excitation element attached to a surface of a structure, the at least one excitation element comprising a photostrictive material and configured to receive the excitation light for generating an oscillating strain, wherein the oscillating strain generates an acoustic wave in the structure; and

a detector configured to detect the acoustic wave,

wherein the at least one excitation element has a resonance frequency based on at least one of a shape, a pattern and a dimension of the at least one excitation element; and

wherein the excitation light is modulated at a modulation frequency matching the resonance frequency of the at least one excitation element.

2. The system as claimed in claim 1, wherein the excitation light is modulated based on a light intensity.

3. The system as claimed in claim 1, wherein the excitation light is modulated based on an optical polarization.

4. The system as claimed in any one of the preceding claims, wherein the photostrictive material comprises a ferroelectric material.

5. The system as claimed in any one of the preceding claims, comprising a plurality of excitation elements, wherein the plurality of excitation elements are attached to the surface of the structure based on a pre-defined pattern.

6. The system as claimed in claim 5, wherein the pre-defined pattern comprises a periodicity, and wherein the excitation light is modulated at a modulation frequency based on the periodicity of the pre-defined pattern.

7. The system as claimed in claim 5 or 6, wherein the pre-defined pattern comprises an orientation, and wherein a direction of propagation of the acoustic wave is defined by the orientation of the pre-defined pattern.

8. The system as claimed in any one of the preceding claims, wherein the at least one excitation element comprises a cantilever.

9. The system as claimed in any one of the preceding claims, wherein the acoustic wave is an ultrasonic wave with frequency above 20 kHz.

10. A method for detecting an anomaly in a structure, the method comprising:

attaching at least one excitation element to a surface of the structure, the at least one excitation element comprising a photostrictive material, wherein the at least one excitation element has a resonance frequency based on at least one of a shape, a pattern and a dimension of the at least one excitation element;

emitting, by a light source, an excitation light onto the at least one excitation element such that an oscillating strain is generated in the at least one excitation element, wherein the oscillating strain generates an acoustic wave in the structure;

modulating the excitation light at a modulation frequency matching the resonance frequency of the at least one excitation element; and

detecting, by a detector, the acoustic wave for detecting an anomaly in the structure.

11. The method as claimed in claim 10, further comprising modulating the excitation light based on a light intensity.

12. The method as claimed in claim 10, further comprising modulating the excitation light based on an optical polarization.

13. The method as claimed in any one of claims 10 to 12, wherein the photostrictive material comprises a ferroelectric material.

14. The method as claimed in any one of claims 10 to 13, comprising attaching a plurality of excitation elements to the surface of the structure based on a pre-defined pattern, wherein the pre-defined pattern comprises a periodicity, and wherein the method further comprises modulating the excitation light at a modulation frequency based on the periodicity of pre-defined pattern.

15. The method as claimed in claim 14, wherein the pre-defined pattern comprises an orientation, and wherein detecting the acoustic wave comprises detecting along a direction of propagation of the acoustic wave defined by the orientation of the pre-defined pattern.

16. The method as claimed in any one of claims 10 to 15, wherein the detector comprises a non-contact sensor.