CLAIMS

1. An optical light source comprising:

an optical resonator comprising a gain medium;

a fiber laser diode optically coupled to the optical resonator; and

an electrical modulator electrically coupled to the fiber laser diode, the electrical modulator configured to switch the optical light source between a first mode of operation in which the optical light source is a continuous wave optical light source, and a second mode of operation in which the optical light source is a pulsed optical light source;

wherein, in the first mode of operation, the fiber laser diode is configured to supply a continuous wave optical pump signal to the optical resonator, and the optical resonator is configured to generate a continuous wave optical signal in response to the continuous wave optical pump signal,

wherein, in the second mode of operation, the fiber laser diode is configured to supply a pulsed optical pump signal to the optical resonator, and the optical resonator is configured to generate a pulsed optical signal in response to the pulsed optical pump signal;

wherein, in the first mode of operation, the electrical modulator is configured to supply a continuous wave electrical signal to the fiber laser diode to generate the continuous wave optical pump signal,

wherein, in the second mode of operation, the electrical modulator is configured to supply a pulsed electrical signal to the fiber laser diode to generate the pulsed optical pump signal; and

wherein a width of the pulsed optical signal is less than a width of the pulsed optical pump signal.

2. The optical light source as claimed in claim 1, wherein the electrical modulator comprises a current modulator.

3. The optical light source as claimed in claim 2, wherein the current modulator comprises an arbitrary waveform generator.

4. The optical light source as claimed in any one of claims 1 to 3, comprising a plurality of fiber laser diodes optically coupled to the optical resonator.

5. The optical light source as claimed in claim 4, further comprising an optical combiner to optically couple the plurality of fiber laser diodes to the optical resonator.

6. The optical light source as claimed in claim 5, wherein the plurality of fiber laser diodes, the optical resonator and the optical combiner are collectively an all-fiber arrangement.

7. The optical light source as claimed in claim 5 or 6, further comprising a passive double cladding fiber to optically couple the optical combiner to the optical resonator.

8. The optical light source as claimed in any one of claims 4 to 7, comprising a plurality of electrical modulators,

wherein a respective electrical modulator of the plurality of electrical modulators is configured, in the first mode of operation, to supply a respective continuous wave electrical signal to a respective fiber laser diode of the plurality of fiber laser diodes to generate a respective continuous wave optical pump signal, and, in the second mode of operation, to supply a respective pulsed electrical signal to the respective fiber laser source to generate a respective pulsed optical pump signal.

9. The optical light source as claimed in any one of claims 1 to 8, wherein the optical resonator comprises a fiber arrangement and the gain medium is comprised in the fiber arrangement, the gain medium comprising a rare-earth doped fiber.

10. The optical light source as claimed in claim 9, further comprising a pair of fiber Bragg gratings defined in the fiber arrangement,

wherein the rare-earth doped fiber is arranged in between the pair of fiber Bragg gratings.

11. The optical light source as claimed in claim 10, wherein the pair of fiber Bragg gratings have different reflectivity values, wherein the fiber Bragg grating having the higher reflectivity value is arranged at an input side of the rare-earth doped fiber, and wherein the fiber Bragg grating having the lower reflectivity value is arranged at an output side of the rare-earth doped fiber.

12. The optical light source as claimed in any one of claims 1 to 11, further comprising an optical beam expander optically coupled to the optical resonator to receive the continuous wave optical signal in the first mode of operation and the pulsed optical signal in the second mode of operation.

13. The optical light source as claimed in claim 12, wherein the optical beam expander comprises a core-less fiber.

14. A method of controlling an optical light source, the method comprising:

switching an electrical modulator so that the optical light source is in a first mode of operation, wherein the electrical modulator supplies a continuous wave electrical signal to a fiber laser diode to generate a continuous wave optical pump signal from the fiber laser diode;

supplying, in the first mode of operation, the continuous wave optical pump signal to an optical resonator comprising a gain medium to generate a continuous wave optical signal from the optical resonator in response to the continuous wave optical pump signal;

switching the electrical modulator so that the optical light source is in a second mode of operation, wherein the electrical modulator supplies a pulsed electrical signal to the fiber laser diode to generate a pulsed optical pump signal from the fiber laser diode; and

supplying, in the second mode of operation, the pulsed optical pump signal to the optical resonator to generate a pulsed optical signal from the optical resonator in response to the pulsed optical pump signal;

wherein a width of the pulsed optical signal is less than a width of the pulsed optical pump signal.

15. The method as claimed in claim 14, wherein the pulsed optical pump signal supplied in the second mode of operation to the optical resonator has a pulse width of between about 50 ns and about 900 ns.

16. The method as claimed in claim 14, further comprising controlling, in the second mode of operation, at least one of a repetition rate or a pulse with of the pulsed electrical signal to control an output power of the optical light source.

17. The method as claimed in any one of claims 14 to 16, wherein the pulsed electrical signal supplied in the second mode of operation to the fiber laser diode has a pulse width of between about 900 ns and about 10 μs.