Technology Offer

METHOD OF GENERATING LASER PULSES USING THE TEMPORAL TALBOT EFFECT

Ref.-No.: 1202-5266-WT

Summary of the Technology

The invention relates to a method of generating laser pulses, in particular by mode-coupling of resonator modes of a laser resonator. A laser mode locking state is proposed in which the pulse disperses quickly and then revives after a number of cavity round tips. This mechanism is based on the temporal Talbot effect, which has for the first time been described in 1836 as a peculiar phenomenon observed in the nearfield of an optical grating.
Creating laser pulses by mode-coupling of laser resonator modes is generally known. Conventional pulse lasers typically create a pulse train of laser pulses, which can be represented in frequency space as a frequency comb with equidistant comb modes, resulting from the temporal periodicity of the pulse train. However, the mode spectrum of a laser according to the invention is not equidistant but increases linearly with high precision. This Talbot frequency comb can be self referenced, so that there is no need to use two different interfering lasers as it was usually done in the past.
The invention thus relates furthermore to a spectroscopy method for investigating a sample, using the laser pulses. By means of the frequency comb with linearly increasing comb modes of the generated laser, the laser pulses can be applied on a spectral response of a sample under investigation. This can then be detected and the detector signal can be analysed for obtaining beat signals created by the comb modes of the laser pulses. Eventually, the spectral response of the sample can be determined from the beat signals.

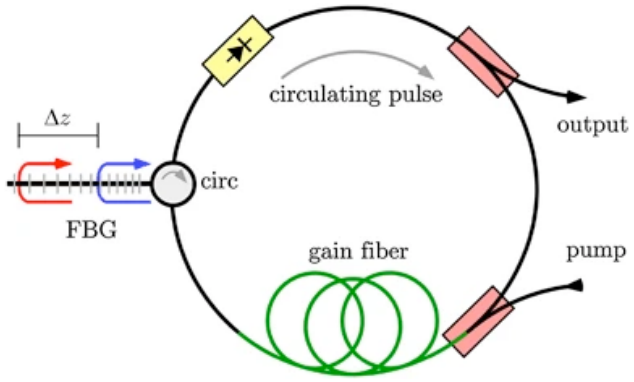

Fig. 1

Advantages

- Not limited by comb jitters
- Does not need two separate frequency combs and the necessary stabilization thereof

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Applications

- Laser physics
- Metrology
- Spectroscopy

Patent Information

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