WHAT IS CLAIMED IS:

1. A laser processing method of processing a workpiece by applying a pulsed laser beam having a wavelength absorbable by the workpiece to the workpiece, the laser processing method comprising:

a holding step of holding the workpiece on a holding table;

a processing step of processing the workpiece by applying the pulsed laser beam to an upper surface of the workpiece held on the holding table;

an image capturing step of capturing an image of the upper surface of the workpiece at a predetermined timing in the processing step, thereby acquiring an image of an irradiated area of the upper surface that is irradiated with the pulsed laser beam;

a detecting step of detecting at least either one of a size and a position of the irradiated area that is brighter than other areas of the upper surface, in the image acquired in the image capturing step;

a calculating step of repeating the image capturing step and the detecting step in the processing step on a plurality of different areas of the workpiece or performing the image capturing step and the detecting step in the processing step on each of a plurality of the

workpieces, thereby obtaining a plurality of acquired irradiated areas, and calculating a variation of at least either one of the size and the position of each of the plurality of acquired irradiated areas each time at least either one of the size and position of each of the acquired irradiated areas is detected in each of the detecting steps, with respect to the plurality of different areas of the workpiece; and

a warning step of issuing a warning when the variation, calculated in the calculating step, of at least either one of the size and the position of each of the acquired irradiated areas exceeds a preset threshold value,

wherein

the variation of at least either one of the size and the position of each of the acquired irradiated areas is quantitatively assessed in the calculating step with respect to elapsed time from a start of laser processing operation.

2. The laser processing method according to claim 1, wherein the detecting step further comprises

measuring a length in predetermined direction of each of the acquired irradiated areas to be measured and additionally calculating coordinates of edges of each of

the acquired irradiated areas to be measured.

3. A laser processing apparatus for processing a workpiece by applying a pulsed laser beam having a wavelength absorbable by the workpiece to the workpiece, the laser processing apparatus comprising:

a holding table for holding the workpiece;

a laser beam applying unit applying the pulsed laser beam;

an image capturing unit capturing an image of the workpiece held on the holding table at a predetermined timing while the workpiece is being processed by the pulsed laser beam applied to an upper surface of the workpiece;

a detecting section for detecting at least either one of a size and a position of an irradiated area of the upper surface of the workpiece which is irradiated with the laser beam applied by the laser beam applying unit, in the image of the irradiated area captured by the image capturing unit at the predetermined timing while the workpiece is being processed by the pulsed laser beam applied to the upper surface of the workpiece held on the holding table by the laser beam applying unit, the irradiated area being brighter than other areas of the upper surface of the workpiece; and

a calculating section for calculating a variation of at least either one of the size and the position of each of a plurality of acquired irradiated areas each time at least either one of the size and position of each of the acquired irradiated areas is detected by the detecting section with respect to a plurality of different areas of the workpiece,

wherein

the image capturing unit and the detecting section each repeats their respective functions when the pulsed laser beam is applied to the plurality of different areas of the workpiece, or the image capturing unit and the detecting section each performs their respective functions when the pulsed laser beam is applied to each of a plurality of the workpieces, thereby obtaining the plurality of the acquired irradiated areas,

a warning is issued when the variation calculated, of at least either one of the size and the position of each of the acquired irradiated areas exceeds a preset threshold value, and

the variation of either one of the size and the position of each of the acquired irradiated areas is quantitatively assessed with respect to elapsed time from a start of laser processing operation.

4. The laser processing apparatus according to claim 3, wherein the detecting section measures a length in predetermined direction of each of the acquired irradiated areas to be measured and additionally calculates coordinates of edges of each of the acquired irradiated areas to be measured.

5. The laser processing method according to claim 1, wherein in the calculating step, an index of the variation used is a standard deviation or a dispersion obtained by squaring the standard deviation, wherein the standard deviation is derived based on data as follows:

(a) a total number of the acquired irradiated areas;

(b) either (b)(i) the size of each of the acquired irradiated areas, or (b)(ii) a Y coordinate of a central line of each of the acquired irradiated areas; and

(c) either (c)(i) an average size of the acquired irradiated areas, in a case where the data as per (b)(i) is used, or (c)(ii) an average value of the Y coordinate of the central line of each of the acquired irradiated areas, in a case where the data as per (b)(ii) is used.

6. The laser processing apparatus according to claim 3, wherein, for calculating the variation, an index of the variation used is a standard deviation or a

dispersion obtained by squaring the standard deviation, wherein the standard deviation is derived based on data as follows:

(a) a total number of the acquired irradiated areas;

(b) either (b)(i) the size of each of the acquired irradiated areas, or (b)(ii) a Y coordinate of a central line of each of the acquired irradiated areas; and

(c) either (c)(i) an average size of the acquired irradiated areas, in a case where the data as per (b)(i) is used, or (c)(ii) an average value of the Y coordinate of the central line of each of the acquired irradiated areas, in a case where the data as per (b)(ii) is used.