WHAT IS CLAIMED IS:

1. A laser processing method to be performed by a laser processing apparatus including a chuck table for holding a wafer, laser applying means having focusing means for applying a laser beam to the wafer held on the chuck table, the laser beam having a transmission wavelength to the wafer, in the condition where the focal point of the laser beam is set inside the wafer, thereby forming a processed portion inside the wafer, X moving means for relatively moving the chuck table and the focusing means in an X direction as a feeding direction, Y moving means for relatively moving the chuck table and the focusing means in a Y direction as an indexing direction perpendicular to the X direction, height detecting means for detecting the height of the upper surface of the wafer held on the chuck table, storing means for storing height information on the height of the upper surface of the wafer detected by the height detecting means at a plurality of X coordinates in the X direction, and control means for controlling the chuck table, the laser applying means, the X moving means, the Y moving means, the height detecting means, and the storing means, the laser processing method comprising:

a forward path height storing step of positioning

the height detecting means in a forward work area of the wafer where the laser beam is to be applied, relatively moving the chuck table and the height detecting means along a forward path in the X direction from the forward work area to a forward measurement end position, detecting the height of the upper surface of the wafer along the forward path from the forward work area to the forward measurement end position by using the height detecting means, and storing the height information at the X coordinates on the forward path into the storing means;

a backward path height storing step of positioning the height detecting means in a backward work area of the wafer where the laser beam is to be applied, the backward area being near an opposite end of the forward path from forward work area and displaced in the Y direction from the forward measurement and position, relatively moving, from the backward work area, the chuck table and the height detecting means along a backward path in the X direction, parallel to and opposite the X direction of the forward path, while detecting the height of the upper surface of the wafer along the backward path from the backward work area to a backward measurement end position displaced in the Y direction from the forward work area

by using the height detecting means, and storing the height information at the X coordinates on the backward path into the storing means;

a forward path processing step of positioning the focusing means in the forward work area, setting the focal point of the laser beam inside the wafer in the forward work area, applying the laser beam to the wafer as vertically moving the focusing means according to the height information stored in the forward path height storing step, and relatively moving the chuck table and the focusing means along the forward path in the X direction; and

a backward path processing step of positioning the focusing means in the backward work area, setting the focal point of the laser beam inside the wafer in the backward work area, applying the laser beam to the wafer as vertically moving the focusing means according to the height information stored in the backward path height storing step, and relatively moving the chuck table and the focusing means along the backward path in the X direction, opposite the X direction of the forward path;

the forward path height storing step, the backward path height storing step, the forward path processing step, and the backward path processing step being

repeated to process the wafer.

2. The laser processing method as defined in claim 1 wherein the backward path height storing step is performed following the forward path height storing step before another forward path height storing step is performed.

3. The laser processing method as defined in claim 2 wherein the forward path processing step and the backward path processing step are performed following the backward path height storing step before another forward path height storing step or another backward path processing step is performed.