CLAIMS

1. A scanning mirror monitoring system, comprising a simple harmonic motion detector unit and a signal processing unit, the simple harmonic motion detector unit configured to monitor a simple harmonic motion of a scanning mirror and to produce a simple harmonic signal, the signal processing unit configured to receive the simple harmonic signal and, based on a variation of the simple harmonic signal, control a scanning mirror actuator unit to adjust a vibration amplitude and/or a position of the scanning mirror,

wherein the simple harmonic motion detector unit comprises a first illumination unit, a first projection unit and a first detection unit, a first measuring beam emanated from the first illumination unit passing through the first projection unit, thereby forming a first detection light spot, which is further incident on the scanning mirror to produce a first reflected beam, the first reflected beam being incident on the first detection unit, which then produces the simple harmonic signal, the first detection unit connected to the signal processing unit,

wherein the first projection unit comprises a projection slit and a projection lens group, the first measuring beam passing through the projection slit and thereby forming the first detection light spot, the projection lens group configured to collimate the first detection light spot into a parallel beam, and

wherein the first detection unit comprises a detection lens, a detection slit, a first relay lens, a second relay lens and a detector, the first reflected beam converged by the detection lens, and the converged beam sequentially passing through the detection slit, the first relay lens and the second relay lens and then being incident on the detector.

2. The scanning mirror monitoring system of claim 1, wherein the simple

harmonic signal is a simple harmonic optical intensity signal.

3. The scanning mirror monitoring system of claim 1, wherein the scanning mirror comprises two parallel surfaces, and wherein the first detection light spot is formed on either one of the surfaces.

4. The scanning mirror monitoring system of claim 1, wherein the first detection light spot is a rectangular light spot.

5. The scanning mirror monitoring system of claim 1, wherein the first illumination unit comprises: a light source from which the first measuring beam is emanated; and an illumination lens group configured to collimate the first measuring beam.

6. The scanning mirror monitoring system of claim 1, wherein the detector is a photodetector.

7. The scanning mirror monitoring system of claim 1, wherein the first detection light spot is incident on the scanning mirror after being reflected.

8. The scanning mirror monitoring system of claim 1, wherein the first reflected beam is incident on the first detection unit after being reflected.

9. A focusing and leveling system, comprising the scanning mirror monitoring system of claim 1 and a focusing and leveling measuring system, the focusing and leveling measuring system comprising a second illumination unit, a second projection unit, the scanning mirror and a second detection unit, wherein a second measuring beam emanated from the second illumination unit passes through the second projection unit, thereby forming a second detection light spot, which is further incident on the scanning mirror to form a second reflected light, wherein the second reflected light, after being converged, is incident on a wafer to produce a secondary reflected beam, wherein the secondary reflected beam is collimated into a parallel beam and then is

incident on the second detection unit, and wherein both the second detection unit and a wafer stage that supports the wafer are connected to the signal processing unit.

10. The focusing and leveling system of claim 9, wherein the first detection light spot from the scanning mirror monitoring system and the second detection light spot from the focusing and leveling measuring system are incident on a same surface of the scanning mirror.

11. The focusing and leveling system of claim 9, wherein the first detection light spot from the scanning mirror monitoring system and the second detection light spot from the focusing and leveling measuring system are incident on respective surfaces of the scanning mirror.

12. The focusing and leveling system of claim 9, wherein the second illumination unit is implemented as the first illumination unit and the second projection unit as the first projection unit.

13. The focusing and leveling system of claim 12, further comprising a beam splitting prism disposed between the scanning mirror and the first projection unit, the beam splitting prism configured to split the first detection light spot into a first detecting beam and a second detecting beam, the first detecting beam incident on one surface of the scanning mirror, the second detecting beam reflected onto the other surface of the scanning mirror.

14. A scanning mirror monitoring method by using the scanning mirror monitoring system of claim 1, comprising the steps of:

1) controlling the scanning mirror to vibrate in a simple harmonic motion, monitoring a resulting simple harmonic signal, and recording a periodic optical intensity profile at standard values of a vibration amplitude and a position of the scanning mirror as an original profile;

2) monitoring a change in the optical intensity profile of the simple harmonic motion of the scanning mirror and accordingly recording a varied optical intensity profile, and if the varied optical intensity profile peaks at a lower value than the original profile, determining that a shift occurs in the position of the scanning mirror, or if the varied optical intensity profile peaks at a same value as the original profile and valleys at a different value from the original profile, determining that a shift occurs in the vibration amplitude of the scanning mirror; and

3) based on the determination in step 2, controlling, by the signal processing unit, the scanning mirror actuator unit to incrementally adjust the scanning mirror until the varied optical intensity profile coincides with the original profile.

15. The scanning mirror monitoring method of claim 14, wherein in step 1 the periodic optical intensity profile peaks at a phase of 0° or 180° of the scanning mirror and valleys at a phase of 90° or 270° of the scanning mirror.

16. The scanning mirror monitoring method of claim 14, wherein step 2 further comprises: if the varied optical intensity profile peaks at the same value, and valleys at a higher value than, the original profile, determining that the vibration amplitude of the scanning mirror has decreased; or if the varied optical intensity profile peaks at the same value, and valleys at a lower value than, the original profile, determining that the vibration amplitude of the scanning mirror has increased.