CLAIMS:

1. An inspection system, comprising:

at least one ray source configured to emit X-rays, wherein each ray source comprises a separate housing configured to define a vacuum space and comprises a plurality of target spots enclosed within the housing;

a detector assembly configured to receive X-rays emitted from the at least one ray source and passing through an inspection region of the inspection system; and

a conveying device configured to carry an object to be inspected,

wherein the at least one ray source and the detector assembly are movable in a traveling direction relative to the conveying device, so that the object to be inspected enters the inspection region, and the at least one ray source is translatable among a plurality of scanning positions when viewed along a central axis of the inspection region, a translation distance of the at least one ray source between two adjacent scanning positions is greater than a spacing between adjacent target spots of each ray source, and the traveling direction is parallel to the central axis; and

wherein the inspection system is configured such that: the at least one ray source and the detector assembly move in the traveling direction relative to the conveying device and the at least one ray source emits X-rays, when the at least one ray source is located at one of the plurality of scanning positions; and the at least one ray source translates to another one of the plurality of scanning positions, after the at least one ray source and the detector assembly move a predetermined distance in the traveling direction relative to the conveying device.

2. The inspection system of claim 1, wherein the at least one ray source is configured to translate between different scanning positions, so that a combined scanning angle of the at least one ray source is greater than 180 degrees.

3. The inspection system of claim 1, wherein the inspection system is configured such that: the at least one ray source and the detector assembly do not move in the traveling direction relative to the conveying device when the at least one ray source translates between different scanning positions.

4. The inspection system of claim 1, wherein the translation distance of each ray source between two adjacent scanning positions is less than a length of the ray source in the translation direction.

5. The inspection system of claim 1, wherein the detector assembly is arranged radially closer to the central axis than the at least one ray source.

6. The inspection system of claim 5, wherein target spots of the at least one ray source are located in a first plane.

7. The inspection system of claim 6, wherein detector crystals of the detector assembly are located in a second plane.

8. The inspection system of claim 7, wherein the first plane is parallel to the second plane, and a target spot of each ray source is configured to deflect a predetermined tilt angle toward the detector assembly along the central axis, so that the X-rays emitted by each ray source are not blocked by the detector assembly before passing through the inspection region.

9. The inspection system of claim 8, wherein the detector assembly comprises a plurality of detector arms, each detector arm is provided with a plurality of detector units, and each detector arm is configured to receive X-rays emitted by at least two ray sources;

wherein each detector unit comprises a detector crystal, and each detector crystal is arranged at an end of a corresponding detector unit close to the at least one ray source along the central axis; and

wherein the plurality of detector arms are configured to extend completely around the central axis to form a detector ring.

10. The inspection system of claim 1, wherein the at least one ray source comprises a plurality of ray sources, and the plurality of ray sources are configured to translate between different scanning positions synchronously; and

wherein the plurality of ray sources are spaced around the inspection region.

11. The inspection system of claim 1, wherein the detector assembly is configured to be translatable when viewed along the central axis of the inspection region; and

wherein the at least one ray source and the detector assembly are configured to synchronously translate when viewed along the central axis of the inspection region.

12. The inspection system of claim 1, wherein each ray source is further configured to be movable between at least two target spot positions, a rotation angle of each ray source between two adjacent target spot positions is less than an angle of two adjacent target spots of the ray source relative to the central axis, or a movement distance of each ray source between two adjacent target spot positions is less than a spacing between two adjacent target spots of the ray source; and

wherein a rotation angle of each ray source between two farthest target spot positions is less than the angle of two adjacent target spots of the ray source relative to the central axis, or a movement distance of each ray source between two farthest target spot positions is less than the spacing between two adjacent target spots of the ray source.

13. The inspection system of claim 1, wherein the at least one ray source is configured to be always located above the conveying device during a translation process;

wherein the central axis is parallel to a horizontal direction; and

wherein a ray emission direction of the at least one ray source is not perpendicular to the central axis.

14. The inspection system of claim 1, wherein the inspection system is configured such that the at least one ray source does not emit X-rays when the at least one ray source translates between different scanning positions;

wherein the at least one ray source and the detector assembly move a predetermined distance in the traveling direction relative to the conveying device, so that the object to be inspected completely passes through the inspection region or the object to be inspected does not completely pass through the inspection region; and

wherein the translation distance of the at least one ray source between two adjacent scanning positions is greater than a spacing between any two target spots of each ray source.

15. An inspection method, comprising the following steps:

(a) carrying an object to be inspected on a conveying device;

(b) positioning, when viewed along a central axis of an inspection region, at least one ray source at one of a plurality of scanning positions surrounding the inspection region, wherein each ray source comprises a separate housing configured to define a vacuum space and comprises a plurality of target spots enclosed within the housing;

(c) moving the at least one ray source and a detector assembly in a traveling direction relative to the conveying device, so that the object to be inspected enters the inspection region, while emitting X-rays from the at least one ray source so that the X-rays pass through the object to be inspected located in the inspection region and are received by the detector assembly, and a scanning process is completed until the at least one ray source and the detector assembly move a predetermined distance in the traveling direction relative to the conveying device; and

(d) translating the at least one ray source to another one of the plurality of scanning positions, and repeating step (c) to complete the scanning process at each of the plurality of scanning positions, wherein a translation distance of the at least one ray source between two adjacent scanning positions is greater than a spacing between adjacent target spots of each ray source, and the traveling direction is parallel to the central axis.

16. The inspection method of claim 15, wherein steps (c) and (d) are repeated, so that a combined scanning angle of the at least one ray source is greater than 180 degrees.

17. The inspection method of claim 15, wherein the at least one ray source and the detector assembly are configured to stop moving in the traveling direction relative to the conveying device after each time the object to be inspected completely passes through the inspection region, and in two adjacent repetitions of step (c), the ray source and the detector assembly are configured to move in opposite directions relative

to the conveying device; and

wherein the translation distance of each ray source between two adjacent scanning positions is less than a length of the ray source in the translation direction.

18. The inspection method of claim 15, further comprising: after completing a scanning process at one of the plurality of scanning positions in step (c), moving the at least one ray source to one of a plurality of target spot positions and repeating step (c), wherein the plurality of target spot positions comprise a current scanning position,

wherein a rotation angle of each ray source between two adjacent target spot positions is less than an angle of two adjacent target spots of the ray source relative to the central axis, or a movement distance of each ray source between two adjacent target spot positions is less than a spacing between two adjacent target spots of the ray source; and

wherein a rotation angle of each ray source between two farthest target spot positions is less than the angle of two adjacent target spots of the ray source relative to the central axis, or a movement distance of each ray source between two farthest target spot positions is less than the spacing between two adjacent target spots of the ray source.

19. The inspection method of claim 15, wherein the at least one ray source is configured to be always located above the conveying device during a translation process of the at least one ray source;

wherein the central axis is parallel to a horizontal direction; and

wherein a ray emission direction of the at least one ray source is not perpendicular to the central axis.

20. The inspection method of claim 15, wherein the at least one ray source does not emit X-rays when the at least one ray source translates between different scanning positions;

wherein the at least one ray source and the detector assembly move a predetermined distance in the traveling direction relative to the conveying device, so that the object to be inspected completely passes through the inspection region or the object to be inspected does not completely pass through the inspection region; and

wherein the translation distance of the at least one ray source between

two adjacent scanning positions is greater than a spacing between any two target spots of each ray source.