**Claims**

1. A CT scanning imaging system based on a single linear scanning channel, comprising:

a conveying device configured to move a scanned object in the single linear scanning channel in a predetermined conveying direction, wherein the conveying device comprises a conveying surface for placing the scanned object;

p scanning segments arranged at intervals in the conveying direction, wherein p is a positive integer greater than or equal to 2, and wherein each of the p scanning segments comprises a plurality of ray sources and at least one detector, in each scanning segment, the plurality of ray sources are sequentially arranged at intervals on one side of the scanning channel and configured to alternately emit ray beams to form a scanning region, and the at least one detector is located on the other side of the scanning channel and configured to detect projection data formed by the ray beams transmitted through the scanned object in a process of the scanned object passing through the scanning region; and

an imaging device configured to generate a three-dimensional reconstructed image of the scanned object according to the projection data detected by each detector in the p scanning segments.

2. The system according to claim 1, wherein the p scanning segments comprise an $i^{th}$ scanning segment and a $j^{th}$ scanning segment, i and j are positive integers greater than or equal to 1 and less than or equal to p, and i is not equal to j;

wherein the $i^{th}$ scanning segment comprises mi ray sources and ni detectors, mi is a positive integer greater than or equal to 2, and ni is a positive integer greater than or equal to 1;

wherein the $j^{th}$ scanning segment comprises mj ray sources and nj detectors, mj is a positive integer greater than or equal to 2, and nj is a positive integer greater than or equal to 1; and

wherein when viewed along the scanning channel, the mi ray sources and the ni detectors are arranged on both sides of the scanning channel in a first layout direction, and the mj ray sources and the nj detectors are arranged on both sides of the scanning channel in a second layout direction.

3. The system according to claim 2, wherein the first layout direction is different from the second layout direction.

4. The system according to claim 2 or 3, wherein an orthographic projection of the first layout direction on a plane perpendicular to the conveying direction intersects with an orthographic projection of the second layout direction on the plane perpendicular to the conveying direction.

5. The system according to claim 4, wherein the orthographic projection of the first layout direction on the plane perpendicular to the conveying direction is perpendicular to the orthographic projection of the second layout direction on the plane perpendicular to the conveying direction.

6. The system according to claim 4, wherein the first layout direction is parallel to a width direction of the scanning channel and parallel to the conveying surface;

wherein the second layout direction is parallel to a height direction of the scanned object and perpendicular to the conveying surface.

7. The system according to claim 3, wherein the first layout direction forms a first inclination angle with respect to the conveying surface, and the first inclination angle is greater than 0° and less than 90°; and/or

wherein the second layout direction forms a second inclination angle with respect to the conveying surface, and the second inclination angle is greater than 0° and less than 90°.

8. The system according to claim 2, wherein an orthographic projection of the first layout direction on a plane perpendicular to the conveying direction coincides with an orthographic projection of the second layout direction on the plane perpendicular to the conveying direction.

9. The system according to claim 2, 3 or 8, wherein a first relative position of the mi ray sources with respect to the ni detectors in the conveying direction is different from a second relative position of the mj ray sources with respect to the nj detectors in the conveying

direction.

10. The system according to claim 9, wherein the ni detectors comprise a first column of detector modules arranged foremost in the conveying direction, and the nj detectors comprise a first column of detector modules arranged foremost in the conveying direction; and

wherein when viewed in a direction perpendicular to the conveying surface, the mi ray sources are offset from the first column of detector modules of the ni detectors by a first offset distance in the conveying direction, the mj ray sources are offset from the first column of detector modules of the nj detectors by a second offset distance in the conveying direction, and the first offset distance is not equal to the second offset distance.

11. The system according to any one of claims 2 to 10, wherein ni=1, and the ni detector is an area array detector; and/or nj=1, and the nj detector is an area array detector; or

wherein ni is greater than or equal to 2, and the ni detectors are linear detector arrays; and/or nj is greater than or equal to 2, and the nj detectors are linear detector arrays;

wherein the ni detectors are arranged at intervals in the conveying direction, and/or the nj detectors are arranged at intervals in the conveying direction; and

wherein the ni detectors are arranged at equal intervals in the conveying direction, or the ni detectors are arranged at equal angular intervals in the conveying direction; and/or

wherein the nj detectors are arranged at equal intervals in the conveying direction, or the nj detectors are arranged at equal angular intervals in the conveying direction.

12. The system according to claim 11, wherein a detection surface of the ni detectors forms a first surface angle with respect to the conveying surface, a detection surface of the nj detectors forms a second surface angle with respect to the conveying surface, and the first surface angle is not equal to the second surface angle; and

wherein the first surface angle is about 90°, and the second surface angle is about 0°.

13. The system according to claim 11, wherein a detection surface of the ni detectors forms a first surface angle with respect to the conveying surface, a detection surface of the nj detectors forms a second surface angle with respect to the conveying surface, and the first

surface angle is equal to the second surface angle.

14. The system according to any one of claims 2 to 13, wherein the mi ray sources are sequentially arranged at intervals along a first straight line, and the first straight line is an imaginary straight line extending in a first direction perpendicular to the conveying surface; and/or

wherein the mj ray sources are sequentially arranged at intervals along a second straight line, and the second straight line is an imaginary straight line extending in a second direction perpendicular to the first direction and the conveying direction.

15. The system according to any one of claims 2 to 14, wherein the mi ray sources have the same beam emission direction, and/or the mj ray sources have the same beam emission direction; or

wherein at least two of the mi ray sources have different beam emission directions, and/or at least two of the mj ray sources have different beam emission directions.

16. The system according to any one of claims 2 to 15, wherein at least one of the mi ray sources is configured to emit a cone beam comprising a first fan-angle direction primary beam plane and a first cone-angle direction primary beam plane; and

wherein at least one of the mj ray sources is configured to emit a cone beam comprising a second fan-angle direction primary beam plane and a second cone-angle direction primary beam plane.

17. The system according to claim 16, wherein the first fan-angle direction primary beam plane is parallel to the second fan-angle direction primary beam plane; and/or

wherein the first cone-angle direction primary beam plane is not parallel to the second cone-angle direction primary beam plane.

18. The system according to claim 16, wherein the first fan-angle direction primary beam plane is not parallel to the second fan-angle direction primary beam plane; and/or

wherein the first cone-angle direction primary beam plane is parallel to the second cone-angle direction primary beam plane;

wherein the first fan-angle direction primary beam plane is perpendicular to the

conveying surface and perpendicular to the conveying direction; or the first fan-angle direction primary beam plane is perpendicular to the conveying surface and forms a first angle greater than 90° and less than 180° with respect to the conveying direction; or the first fan-angle direction primary beam plane forms a first included angle not equal to 90° with respect to the conveying surface and is perpendicular to the conveying direction; or the first fan-angle direction primary beam plane forms a first included angle not equal to 90° with respect to the conveying surface and forms a first angle greater than 90° and less than 180° with respect to the conveying direction; and/or

wherein the second fan-angle direction primary beam plane is perpendicular to the conveying surface and perpendicular to the conveying direction; or the second fan-angle direction primary beam plane is perpendicular to the conveying surface and forms a second angle greater than 0° and less than 90° with respect to the conveying direction; or the second fan-angle direction primary beam plane forms a second included angle not equal to 90° with respect to the conveying surface and is perpendicular to the conveying direction; or the second fan-angle direction primary beam plane forms a second included angle not equal to 90° with respect to the conveying surface and forms a second angle greater than 0° and less than 90° with respect to the conveying direction;

wherein the first cone-angle direction primary beam plane is parallel to the conveying surface, or the first cone-angle direction primary beam plane is perpendicular to the conveying surface, or the first cone-angle direction primary beam plane forms a third included angle greater than 0° and less than 90° with respect to the conveying surface; and/or

wherein the second cone-angle direction primary beam plane is parallel to the conveying surface, or the second cone-angle direction primary beam plane is perpendicular to the conveying surface, or the second cone-angle direction primary beam plane forms a fourth included angle greater than 0° and less than 90° with respect to the conveying surface;

wherein the first fan-angle direction primary beam plane comprises a first cone angle, and the first cone angle corresponds to a size of at least one of the ni detectors in a first arrangement direction perpendicular to the first layout direction; and/or

wherein the second fan-angle direction primary beam plane comprises a second cone angle, and the second cone angle corresponds to a size of at least one of the nj detectors in a first arrangement direction perpendicular to the second layout direction; and/or

wherein the first cone-angle direction primary beam plane comprises a first fan angle, and the first fan angle corresponds to a size of the ni detectors in a second arrangement

direction parallel to the conveying direction; and/or

wherein the second cone-angle direction primary beam plane comprises a second fan angle, and the second fan angle corresponds to a size of the nj detectors in a second arrangement direction parallel to the conveying direction.

19. The system according to any one of claims 1 to 18, wherein the scanned object comprises at least one of a container, a car, or a truck, and each of the plurality of ray sources comprises a MeV-level accelerator; or

wherein the scanned object comprises at least one of a suitcase or a parcel, and each of the plurality of ray sources comprises a KeV-level X-ray machine.

20. A CT scanning imaging method applied to the system according to any one of claims 1 to 19, comprising:

driving a scanned object to move in a scanning channel in a predetermined conveying direction using a conveying device, wherein the conveying device comprises a conveying surface for placing the scanned object;

controlling the scanned object to sequentially pass through p scanning regions formed by p scanning segments, wherein mi ray sources in an $i^{th}$ scanning segment among the p scanning segments are controlled to alternately emit ray beams to form a scanning region before the scanned object enters a scanning range of the $i^{th}$ scanning segment such that the scanned object passes through the scanning region of the $i^{th}$ scanning segment, and ni detectors in the $i^{th}$ scanning segment are controlled to detect projection data formed by the ray beams transmitted through the scanned object in a process of the scanned object passing through the scanning region of the $i^{th}$ scanning segment, where i and j are positive integers greater than or equal to 1 and less than or equal to p, mi is a positive integer greater than or equal to 2, and ni is a positive integer greater than or equal to 1; and

generating a computed tomography image of the scanned object according to a plurality of projection data formed by the detectors in the p scanning segments.