CLAIMS

What is claimed is:

1. A three-axis microelectromechanical system (MEMS) gyroscope, comprising:

a first proof mass configured to move in an X-axis direction;

a second proof mass configured to rotate around an X-direction axis, a Y-direction axis, and a Z-direction axis~~, wherein when the first proof mass moves in the X-axis direction, the second proof mass is driven to rotate around the Z-direction axis~~;

a third proof mass configured to move in the X-axis direction and a Y-axis direction;~~,~~ ~~wherein when the first proof mass moves in the X-axis direction, the third proof mass is driven to move in the Y-axis direction; and~~

a fourth proof mass configured to move in the X-axis direction, wherein ~~when the third proof mass moves in the X-axis direction, the fourth proof mass is driven to move in the X-axis direction,~~ the third proof mass is connected to the fourth proof mass through a spring beam; and when the third proof mass moves in the X-axis direction, the fourth proof mass is driven to move in the X-axis direction; ~~wherein~~

~~the proof masses are connected by spring beams and/or rigid beams.~~

a first rigid beam, wherein the first rigid beam is respectively connected to the first proof mass and the third proof mass through a spring beam; and when the first proof mass moves in the X-axis direction, the first rigid beam is driven to move, and the third proof mass is driven by the first rigid beam to move in the Y-axis direction;

a second rigid beam, wherein the second rigid beam is respectively connected to the second proof mass and the first rigid beam through a spring beam; and when the first proof mass moves in the X-axis direction, the first rigid beam is driven to rotate around the Z-direction axis, the second rigid beam is driven by the first rigid beam to rotate around the Z-direction axis, and the second proof mass is driven by the second rigid beam to rotate around the Z-direction axis; and

a third rigid beam, wherein the third rigid beam is respectively connected to the second proof mass and a fixed anchor through a spring beam; and the X-direction axis and the Y-direction axis are defined by the spring beam connected to the third rigid beam, so that the second proof mass is fit to rotate around the X-direction axis and the Y-direction axis.

~~2. The three-axis MEMS gyroscope according to claim 1, further comprising a first rigid beam, wherein the first rigid beam is respectively connected to the first proof mass and the third proof mass through a spring beam; and when the first proof mass moves in the X-axis~~

~~direction, the first rigid beam is driven to move, and the third proof mass is driven by the first rigid beam to move in the Y-axis direction.~~

~~3~~2. The three-axis MEMS gyroscope according to claim ~~2~~1, wherein the first rigid beam comprises a plurality of sub-beams, wherein a joint of the first rigid beam and the first proof mass is set to connect two of the plurality of sub-beams to the first proof mass through one spring beam; a joint of the first rigid beam and the third proof mass is set to connect two of the plurality of sub-beams to the third proof mass through one spring beam; and the plurality of sub-beams are sequentially connected end to end.

~~4. The three-axis MEMS gyroscope according to claim 2, further comprising a second rigid beam, wherein the second rigid beam is respectively connected to the second proof mass and the first rigid beam through a spring beam; and when the first proof mass moves in the X-axis direction, the first rigid beam is driven to rotate around the Z-direction axis, the second rigid beam is driven by the first rigid beam to rotate around the Z-direction axis, and the second proof mass is driven by the second rigid beam to rotate around the Z-direction axis.~~

~~5~~3. The three-axis MEMS gyroscope according to claim ~~4~~1, wherein the second rigid beam is further connected to a fixed anchor through a spring beam, and the second rigid beam is restricted from moving in the X-axis direction and the Y-axis direction.

~~6. The three-axis MEMS gyroscope according to claim 5, further comprising a third rigid beam, wherein the third rigid beam is respectively connected to the second proof mass and the fixed anchor through a spring beam; and the X-direction axis and the Y-direction axis are defined by the spring beam connected to the third rigid beam, so that the second proof mass is fit to rotate around the X-direction axis and the Y-direction axis.~~

~~7. The three-axis MEMS gyroscope according to claim 1, wherein the third proof mass is connected to the fourth proof mass through a spring beam; and when the third proof mass moves in the X-axis direction, the fourth proof mass is driven to move in the X-axis direction.~~

~~8~~4. The three-axis MEMS gyroscope according to claim ~~7~~1, wherein the fourth proof mass is further connected to a fixed anchor through a spring beam, and the fourth proof mass is configured to move in the X-axis direction, and restricted from moving in the Y-axis direction.

~~9~~5. The three-axis MEMS gyroscope according to claim 1, further comprising a first fixed electrode and a second fixed electrode, wherein the first fixed electrode and the second fixed electrode coordinate with the second proof mass to form corresponding detection capacitors, which are respectively configured to perform detection when the second proof mass rotates around the X-direction axis and around the Y-direction axis.

~~10~~6. The three-axis MEMS gyroscope according to claim 1, further comprising a third fixed electrode, wherein the third fixed electrode coordinates with the fourth proof mass to form a detection capacitor.