The aim is therefore to achieve the most homogeneous mounting possible for the ring structure, with which the perfect symmetry of the ring structure is influenced as little as possible. This could be achieved by completely omitting the mounting, but this is very difficult to implement. Alternatively, when many springs are used that are distributed around the circumference, the springs must not be too stiff, as otherwise they would influence the ring locally too much and increase the natural frequencies of the overall system. There is therefore a conflict of objectives to provide a coupling that is as soft as possible, but at the same time does not require too much installation space.

Embodiments of the present invention disclose a microelectromechanical coupling device and an annular microelectromechanical angular rate sensor which achieve the above-mentioned advantages of a free-floating, non-mounted ring, without causing the above-mentioned disadvantages.

According to a first aspect pf the present invention, there is provided a microelectromechanical coupling device for coupling microelectromechanical components, including: a flexible ring structure which forms a circle at rest, which can be deformed substantially parallel to the plane of the circle and which is suitable for coupling the microelectromechanical components; and a plurality of spring elements which are suitable for connecting the ring structure to a substrate; wherein the coupling device has such a large number of spring elements with such a width in a circumferential direction of the ring structure and such a spring hardness that the deformability of the ring structure is homogeneous in a circumferential direction of the ring structure; and the ratio of an effective overall stiffness of the spring elements during operation of the coupling device in an oscillation mode to the product from a number of spring elements and an effective stiffness of the ring structure in the corresponding oscillation mode is less than or equal to 1.

According to a second aspect pf the present invention, there is provided a microelectromechanical measuring device, including the above microelectromechanical coupling device; and the microelectromechanical components that are connected to the coupling device.

According to a third aspect pf the present invention, there is provided a annular microelectromechanical angular rate sensor, including the above microelectromechanical coupling device; wherein the ring structure is suitable for producing an excitation oscillation, said excitation oscillation being superimposed with a detection oscillation generated by the Coriolis force during a rotation of the ring structure; and the spring elements constitute the microelectromechanical components.

A microelectromechanical coupling device for coupling microelectromechanical components has a flexible ring structure, which forms a circle at rest, which can be deformed substantially parallel to the plane of the circle, and which is suitable for coupling the microelectromechanical components. Moreover, the coupling device includes a plurality of spring elements which are suitable for connecting the ring structure to a substrate, wherein the coupling device includes such a large number of spring elements with such a small width in a circumferential direction of the ring structure and such a low spring hardness that the deformability of the ring structure in a circumferential direction of the ring structure is homogeneous.

The coupling device therefore has a ring as its basic structure, which is mounted above a substrate and, for example, has the shape of a self-contained bar, the height of which perpendicular to the substrate is many times its width parallel to the substrate. In the rest position, this ring forms a circle in the broadest sense, i.e., a closed curve that is parallel to the substrate. A deformation of the ring is then substantially only possible parallel to the substrate, i.e., deflections perpendicular to the substrate are negligible for the operation.