

A Novel Combined Fused Silica Cylinder Shell Vibrating Gyroscope

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We propose a novel combined fused silica cylinder shell vibrating gyroscope. The cylinder wall and the bottom disk of the fused silica resonator are fabricated separately and then are connected by glue. By using this method, the difficulty of manufacturing the fused silica cylinder vibrating gyroscope can be significantly reduced. The structure characteristics and vibration modes of the combined fused silica resonator are first analyzed and then the fabrication processes of the gyroscope are introduced, including the machining process of the combined resonator, the mass balancing method for minimizing the natural frequency split, and the control circuit of the gyroscope. Finally, a performance test of the combined gyroscope was implemented, including a Q factor test, frequency stability test, and bias stability test. Experimental results show that the combined fused silica cylinder vibrating gyroscope has good bias stability at room temperature and has the potential to achieve higher accuracy.

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