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STUDY ON THE RESONATOR FIBER-OPTIC GYROSCOPE WITH DOUBLE NON-RECIPROCAL
RINGS**Abstract**

The clockwise and counterclockwise signal lights usually circulate in the same fiber-optic ring in the traditional resonator fiber-optic gyroscope (RFOG), which gives rise to or enhances some coherent noises. And these noises now become a bottleneck for the precision improvement of RFOGs. Substituting the single ring with two reciprocal rings in RFOGs may mitigate the coherent noises effectively. But it is very difficult to produce two reciprocal rings. In view of these factors this paper puts forward a new kind of RFOG, i.e., the Resonator Fiber-Optic Gyroscope with Double Non-Reciprocal Rings (RFOG-DNRR). Five main characteristics of RFOG-DNRR are: using two non-reciprocal fiber-optic rings and therefore relaxing the requirements for arts and crafts, eliminating the Rayleigh backscattering noise which is one main coherent noise in the traditional RFOGs, avoiding Fresnel reflection noise and other backscattering noises, suppressing the Kerr noise, and removing the coupling noise induced by 2x2 fiber-optic coupler in the traditional RFOGs. Next configuration and working mechanism (especially the Joint-Computation method) of RFOG-DNRR are elaborated. Finally the theoretical measuring precision of RFOG-DNRR is analyzed, which indicates that RFOG-DNRR is able to acquire high precision (<0.01 Degree/hour).