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ORTHOGONAL FLUXGATE GRADIOMETER SENSOR AND ITS APPLICATION IN PARTICLE DETECTION

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Abstract: A novel method for constructing an integrated gradiometer and magnetometer is proposed based on Fundamental Mode Orthogonal Fluxgate (FM-OFG) operation. In the integrated sensor construction, the summation of both sensor head outputs is used for the magnetometer operation and the subtraction of them is used for the gradiometer operation. The baseline separation distance between the sensor heads is adjustable. The sensor heads pair can be configured either axially or in parallel. Experiments were conducted with axial configuration of 5 cm baseline to show the selective detection capability to gradient and homogeneous magnetic field. The sensing system presented can be used to measure the average and the gradient of input magnetic field and its interesting applications are the gradiometric sensing of magnetic field distribution anomalies in relatively large homogenous magnetic field interference.