Optoelectronic System for Real Time Monitoring of Motions in Stratified Fluids

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This paper elucidates an innovative method and system for real time monitoring of stratified fluid motions, for example motions in the ocean and atmosphere. The optoelectronic system for real time monitoring of stratified fluids comprises of beam of light (or a laser) falling on the surface of a photo detector in such a way that the received light falls on the active sensing area of the photo detector, after passing through the stratified fluid medium (Fig. 1). The light intensity falling on the photo detector undergoes changes due to changes in the optical refractive gradient generated as a result of wave motions in the stratified fluid[1]. The photo detector records the precise time varying light intensity pattern, corresponding to the time varying motions experienced in the stratified fluid due to motions. The output signals from the photo detector are recorded and compared with those obtained from a standard sensor.

The efficacy of this novel method and system for real time monitoring of stratified fluids is demonstrated, by monitoring internal waves and tsunami waves simulated in the laboratory. An inter comparison of the data obtained using this system and data from an industry standard pressure transducer (variations of which are currently being used for monitoring surface waves and tsunamis), demonstrated the efficacy of our system as highly sensitive and free from many limitations associated with conventional sensors. The optoelectronic system described in this paper is an *in situ* device which can be deployed in any stratified medium for the real time monitoring. Extensive studies also demonstrated that the system can also be employed to detect and discriminate platform generated turbulence in the ocean.

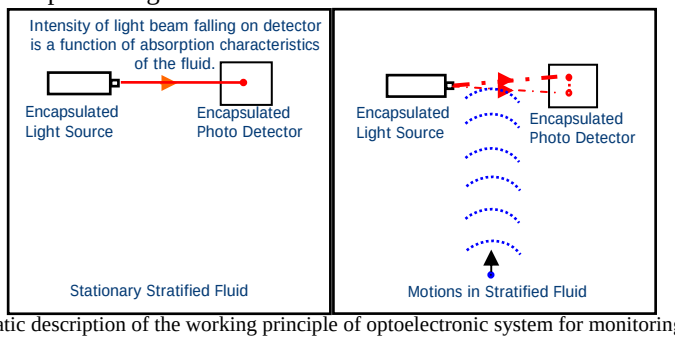

Fig. 1: Schematic description of the working principle of optoelectronic system for monitoring stratified fluid motions.

References

[1] R. Tatavarti *et al.*,*Curr. Sci.* **69 (8)**, 689-695 (1995).