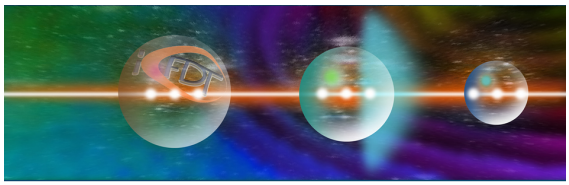

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Fiber optic river navigability monitoring system

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Fiber Bragg Grating (FBG) sensor systems are widely used to monitor mechanical parameters for structural health
monitoring (SHM) of civil engineering structures. Among the so many applications, the FBG technology allows
the development of weighing pads that have a fully passive optical working principle, with no need of electrical
power at the measuring point.
In this contribution, a technical solution for monitoring the navigability of the "Po"river, proposed in the framework of the European project CRISTAL (Climate resilient and environmentally sustainable transport infrastructure, with a focus on inland waterways) is detailed. Indeed, the sensitivity to the weight variations of
FBGs by varying sand accumulation in laboratory tests is exposed.
Weighing pads based on the FBG technology are under development in the ENEA FOS (Fiber Optic Sensor) laboratory for the permanent monitoring of the accumulation of sand/debris along section lines of waterways critical in order to measure the water depth and the related safe navigation. The submerged condition heavily calls
for passive solutions to lower failure events and required maintenance. Indeed, the available industrial solutions
for submarine fibre optic cables (materials, deploying techniques, sealed junction enclosures) ensure the technical
feasibility.
The sensor characterization is essential not only to assess the long time monitor, but it is useful for operational monitoring of the system and for the digital twin moke up. Finally, the setup of the measuring system created in
the swimming pool is described.

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