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Supervisor Expression of Interest MSCA-IF Marie Sklodowska Curie Action-Individual Fellowship

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Department Name: Research topic: (https://www.polimi.it/en/scientific-research/research-structures/departments/)	DEIB PE2_17 Metrology and measurement Remote Optical Sensing and Structural Monitoring by Distributed Optical Fiber Sensors”
MSCA-IF Research Area Panels	<input type="checkbox"/> CHE_Chemistry <input type="checkbox"/> ECO_Economic Sciences <input checked="" type="checkbox"/> ENG_Information Science and Engineering <input type="checkbox"/> ENV_Environmental and Geosciences <input type="checkbox"/> LIF_Life Sciences <input type="checkbox"/> MAT_Mathematics <input type="checkbox"/> PHY_Physics <input type="checkbox"/> SOC_Social Sciences and Humanities
Politecnico di Milano Areas:	<input type="checkbox"/> Cultural Heritage <input type="checkbox"/> Smart Cities <input type="checkbox"/> Territorial Fragilities <input type="checkbox"/> Health <input checked="" type="checkbox"/> Industry 4.0
Brief description of the Department and Research Group (including URL if applicable):	Dipartimento di Elettronica, Informazione e Bioingegneria (DEIB) aims at being a world-class scientific institution committed to forefront research, education, and technology transfer in computer science and engineering, electronics, systems and control, telecommunications, and bioengineering. Inside DEIB the Electrical Engineering research area was established with two primary goals. The Research Group has a long tradition in the fields of optical measurements and development of optoelectronic sensors. In the Laboratory MOLES http://www.deib.polimi.it/ita/laboratori-deib/dettagli/5 is where most of the experimental research activity is conducted, also in cooperation with other international groups. The research group in POLIMI-DEIB is made of 7 Professors



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	<p>and 2 full-time Academic Researchers working in Electrical, Electronic, and Optical Measurements. In particular, a smaller group of 3 Professors (Cesare Svelto, Michele Norgia, and Alessandro Pesatori) is more directly in charge of Optical Measurements and Optoelectronics Sensors.</p> <p>In the past 5 years, a novel and fruitful international research activity has been performed in cooperation with the Bauman Moscow State Technical University of Moscow (BMSTU) within a bilateral POLIMI-BMSTU Common Research Agreement.</p> <p>The main topic of this Italian-Russian cooperation is about solid-state lasers for precision measurements and distributed fiber sensor aimed at real-time monitoring of gas and oil pipelines.</p>
<p>Brief project description: (max 1 page)</p>	<p>Oil and gas pipelines (with terrestrial and underwater installations) are worldwide employed to distribute such precious natural resources. Oil and gas leakage from pipelines can be as common, as difficult to detect when in small but continuous quantities, over long-haul transmission lines. This waste is causing both economical loss and environment pollution.</p> <p>The use of distributed fiber sensors, along the pipeline, is proposed and already used to locate structural integrity or faults in the transport line. Phase-sensitive Optical Time Domain Reflectometers (FI-OTDR) can be used for this purpose, with the aim of detecting (irregular vs. regular pipe behavior) and ranging (finding location with <100 m accuracy) along the pipeline.</p> <p>In addition to pipeline monitoring the FI-OTDR was already proposed for continuous online measurements on train tracks. Surveillance of trains positions and velocities as well as remote monitoring of track integrity is possible by distributing several kilometers of optical fibers along the train track.</p> <p>Development and testing of novel Er-Yb:glass lasers, with narrow linewidth and low short-term noises, is going on in POLIMI and BMSTU. The aim is to use such laser sources, operating in the EDFA optical band at 1.55 μm, as compact and low-cost optical sources for the new-generation FI-OTDR systems.</p> <p>Organization of a Master Class at POLIMI-DEB on “remote optical sensing and structural monitoring (pipelines and train tracks) by optical fiber sensors” is a further goal that we wish achieving.</p>