**Project Information Sheet**

**BabyLux  
An optical neuro-monitor of cerebral oxygen metabolism and blood flow for neonatology**

**The BabyLux project aims to provide a precise, non-invasive and robust integrated system to continuously monitor cerebral oxygen metabolism and blood flow in extremely preterm neonates. The tool will enable neonatologists to prevent the neurological damage due to lack of oxygenation in the brain that not infrequently is accompanied at premature birth.**

BabyLux stems from the analysis on the rise of preterm births and the need to reduce the possible clinical complications on the baby due to lack of oxygenation in the brain. According to the Global Action Report published by The World Health Organization in 2012, preterm births are 15 million every year and rising. The extremely preterm infants (born at less than 28 weeks of gestation) represent 0.5% of all births which when translated into numbers is equivalent to more than 25,000 cases per year in Europe. These children have a higher risk of death, approximately 20%. Furthermore, one in four grows up with some kind of disability, mainly due to brain injury. In fact, during early stages of brain development, injury from lack of blood flow and oxygen delivery may induce cognitive and physical handicaps.

**The goal is to reduce the risk of brain lesions in extremely preterm babies which can eventually decrease the number of children with disabilities**, and fill a void in the neonatal intensive care, where there aren’t any reliable tools to assess the brain blood flow and oxygenation in infants born prematurely.

The project takes up complete R&D works and extends already tested prototypes to the level of demonstrator, bridging the gap between research products and commercialization. A **non-invasive, continuous, cot-side monitor system of cerebral oxygen metabolism and blood flow is an unfilled niche in clinical care**.

**The tool is portable**, easy to operate by busy clinical staff and can be brought to the bedside, and measurements can be done in a few minutes or done repeatedly if the condition is critical.

The system uses **photonic technologies** (diffuse correlation spectroscopy, DCS, and time resolved near-infrared spectroscopy, TRS). This innovative combination provides the state-of-the-art in accuracy and robustness in TRS, and introduces, for the first time, DCS in a combined instrument.

**This tool will reduce the risk of brain damage in newborns from 25% to 20% which can eventually decrease the number of children with disabilities by more than 1,000 per year in Europe alone.**

The instrument will first undergo a demonstration phase in laboratory settings and later a trial period in real-life settings, conducted in parallel at the Mangiagalli Hospital in Milan and at the Rigshospitalet in Copenhagen. The advantages of the proposed system will be evaluated by professional end-users during validation tests carried out in conditions fitting in the clinical workflow, protocols and procedures.

Thanks to the development of this new technique, doctors will then hold monitored during the first months of life, the development of the infant's brain and see how much oxygen is in fact present in the cerebral cortex, in addition to controlling the regularity of blood flow. The results of this analysis provide a valuable prevention tool to reduce the possible serious complications later, like cerebral palsy and cognitive, visual, and hearing impairments.

BabyLux involves Politecnico di Milano, Fondazione Politecnico di Milano, ICFO-Institute of Photonic Sciences, Fraunhofer Institute for Production Technology IPT, Hemophotonics SL, PicoQuant GmbH, Competitive Network SL, Capital Region of Denmark and Fondazione IRCCS Ca’ Granda Ospedale Maggiore Policlinico.

