

INTELLIGENT BEAMLINES

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Increasingly, automatic systems are required to have high dynamical performance and robust behaviours, yet they are expected to cope with more complex, under development and highly non-linear dynamic processes. A very promising approach in dealing with this scenario is through Intelligent Systems (IS). IS incorporate the creative, abstract and adaptive attributes of a human while minimising the undesirable aspects such as unpredictability, inconsistency, fatigue, subjectivity and temporal instability. Even if the Autonomous Systems area has always provided the demonstration platform of IS, the methodologies are applicable to a wider range of complex problems. Synchrotrons Radiation facilities or Free Electron Lasers with their complex data acquisition, data analysis, diagnostic and control problems provide a challenging application area for Intelligent Systems. The paper describes a framework for the conceptual development of IS for Experimental Physics. The resulting hybrid intelligent control system has been tested on a pilot project: the intelligent beamline, a beamline which can solve autonomously complex diagnostic problems and automatic alignment goals.