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SUBATECH

## Non Proliferation and Radioactivity

The International Atomic Energy Agency (IAEA) assists in the development of nuclear technologies world-wide, and ensures that they remain for peaceful use thanks to its Safeguards department. The objectives of the Safeguards activities are three-fold :

- to detect the diversion of nuclear material ;
- to detect the misuse of facilities for unreported production of nuclear material ;
- to detect undeclared activities.

Radioactivity is a specific signature of the presence of a nuclear material and as such plays a central role in the detection methods used by the inspectors of the Agency. Among the main issues that IAEA inspectors are expected to face in the near future will be the spread of new nuclear facilities, some comprising innovations challenging the current tools used for safeguards, while the budgetary constraints grow tighter. Instrumentation based on knowledge inherited from nuclear or particle fundamental physics, as well as nuclear data and modeling tools, could help, for instance, to monitor Generation IV reactors or the use of innovative fuels. In this lecture, we will first introduce the specific context of the non proliferation, then we will present a few of the detection techniques which are employed nowadays in the field, and some of the most « exotic » techniques under development.