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INVITED LECTURE - Update of GEN-IV reactors and lead cooled reactors

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The path to develop advanced nuclear reactors that are superior to current systems is described in the 2002 Roadmap Report entitled “A Technology Roadmap for Generation IV Nuclear Energy Systems” which was prepared by the Generation IV International Forum (GIF) in 2002. This roadmap defined challenging technology goals for advanced reactor systems in four major areas:

- Sustainability,
- Economics,
- Safety and reliability, and
- Proliferation resistance and physical protection.

Of the six systems identified as promising by the GIF roadmap, the three inherently fast reactors are the GFR, SFR and LFR. Fast reactor systems, offer the potential for great efficiency in fuel utilization, and can be considered a superior option to achieve the goal of long-term sustainability.

The Fukushima accidents have drawn increased attention to the need for advanced reactors to be resilient in the face of unforeseen and/or severe accident conditions. In this context, the intrinsic characteristics of lead as a coolant lead to particular advantages of the LFR as an advanced reactor technology to meet present and future needs.

An extensive R&D program related to heavy-metal cooled systems was recently initiated in Europe. These efforts, conducted under the of EURATOM projects of the 6th and 7th Framework Programme, are addressing many of the most important issues related to the viability of the LFR.

In the ELSY project of the 6th Framework Programme, effort has been spend to improve compactness for economics and to improve the plant performance with respect to seismic loads. The abovementioned goals require large innovation of the primary system configuration and the use of innovative components which need extensive experimental campaigns devoted to qualification and functional confirmation.

In Europe the Romanian Government has expressed interest to Euratom in hosting the Demo of the LFR. Russia maintains interest in LFR and recently Chinese Organizations have started involving in LFR technology.

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