## **Overview of Liquid Lithium Lead Breeder Blanket Program in China**

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China focuses on the development of the Liquid LiPb blanket due to attractive performances, such as LiPb with high tritium breeding capability and large thermal conductivity, without the need of an additional neutron multiplier. A series of LiPb breeder blanket concepts were proposed by FDS Team in ASIPP, such as single He-cooled blanket (SLL, ~450 °C), double-cooled blanket (DLL, ~700 °C), and high temperature scenario (special DLL, ~1000 °C). Based on common features of above concepts, the Dual Functional Lithium Lead - Test Blanket Module (DFLL-TBM) was developed as one of the candidate concepts for ITER, and the 1/2-size-reduced DFLL-TBM, named EAST-TBM, was also developed according to the roadmap of DFLL-TBM development with an intermediate step in the EAST tokamak.

With respect to the key technology of LiPb blanket, the significant progress on R&D issues is being made. At present, 1.1 ton ingot of the CLAM (China Low Activation Martensitic) steel was successfully produced by means of vacuum melting, and the chemical composition and mechanical property agreed with the requirements of design. Furthermore, the irradiation experiments of CLAM steel were performed under a variety of irradiation environments, such as neutron, electron, ion, and plasma. Especially, the high dose neutron irradiation (>15dpa) experiment for CLAM steel was finished at the Swiss spallation neutron source. The joining techniques (i.e. HIP, Beam, TIG welding technology) for CLAM have been successfully investigated and the small scale mockup using CLAM steels is being assembled. Moreover, the multi-function forced-driven LiPb loop (containing a 2T magnet), which can serve MHD and material experiments under a variety of LiPb temperature and velocity conditions, was constructed and is being carried out commissioning.

In additional, the projects on fabrication and experiment of the EAST-TBM, construction of LiPb/He combination loop for integrated functional experiments of TBM, as well as construction of the high-intensified D-T neutron source (HINEG) for fusion neutronics benchmark and material experiments have been placed on the national fusion program and the advance nuclear energy program in Chinese Academy of Sciences, the relevant studies on above projects are being carried out.

This overview paper reports the relevant studies on concept designs, R&D activities under way, and development plan for LiPb breeder blanket in China.