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Progress in Advanced Accelerator Driven Nuclear Energy System

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Accelerator Driven Subcritical system is believed to be the best candidate for nuclear waste transmutation. In the design scheme of ADS plant with one target, high-intensity external neutrons are concentrated in the center of the core which will result in a high power peak factor. To solve the challenges, a Multi-Beam Accelerator Driven Subcritical（MB-ADS）system is proposed. The spallation target is designed as a unit similar to the fuel assembly. The accelerated beam is split into multi-beams by the radio frequency cavity in the beam line. The spaces between neighbor beams are furtherly enlarged by a duodecuple. The high current proton beam is split into multiple parts and injected into different targets located in the core to improve the beam efficiency and flatten the spatial power distribution of the core. Compared with the results of one target ADS scheme, the reasonable MB-ADS scheme have advantages in both beam efficiency, core power flattening and transmutation.

Primary author: HE, Yuan (IMP, CAS)

Presenter: HE, Yuan (IMP, CAS)

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