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Oral_28: ITER Diagnostics Progress in China

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Four ITER diagnostics are being developed in China, namely Neutron Flux Monitors (NFM), Radial X-Ray Camera (RXC), Equatorial Port 12 (EP#12) Integration, and Divertor Langmuir Probes (DLP). Based on functional specifications, China Domestic Agency (CNDA) performs the design of the diagnostic system besides delivering the diagnostic components. NFMs, located in equatorial port 1, 7, 8, 17, measure the total neutron flux and emissivity from the plasma, providing information of the fusion power. RXC, providing measurement of the X-ray emission over the full poloidal profile, will be integrated within EP#12, together with 6 other tenant systems. DLP, with 400 probes installed along five divertor cassettes, measures the plasma parameters at the divertor target plates. As one of the most advancing ports, EP#12 design has been completed and steps into manufacturing phase, targeting ITER first plasma in 2025. RXC system has completed the design of camera structure, electronics, and instrumentation and control (I&C) components. NFM in EP#07 has passed the preliminary design review (PDR), a gate before proceeding to final design phase, while the remaining NFMs in other ports are in PDR phase. Moreover, NFM#07 sub-system “support frame”, a captive component, became the first diagnostic component installed in the tokamak pit. Regarding the DLP system, the probe sensors need to survive the high thermal and nuclear radiation in the ITER divertor, which leads to a full-tungsten design. The probe manufacturing had been studied and samples are being tested for structure and performance assessment. With strong support from Southwestern Institute of Physics (SWIP) and Institute of Plasma Physics, Chinese Academy of Sciences (ASIPP), CNDA is working closely with ITER Organization and other interfacing DAs, increasing pace as ITER construction accelerates.

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