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ITR/P5-40: Overview of the ITPA R&D Activities for Optimizing ITER Diagnostic Performance

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The research and development activity of the International Tokamak Physics Activity Topical Group (ITPA TG) on Diagnostics is focused on identification and solutions for diagnostic techniques, which are critical for ITER scientific goals. While majority of diagnostic systems has been developed and integrated with the main body, several issues related to ITER environment are still outstanding and R&D efforts on these issues are progressing. In order to demonstrate reheating of fusion products, the measurement of escaping alpha particles, which may lead to excess erosion and damages on the first wall, is critical in addition to the measurement of confined alphas. An accurate confirmation of the fusion energy gain entirely relies on the precise neutron (from DD and DT reactions) measurement and its calibration. Life time issue of the plasma facing mirror for all optical diagnostics is critical due to the degraded reflectivity of these mirrors over the operation period. Safety requirements demand an accurate assessment on dust and erosion of the first wall material and divertor plate. Impacts of the reflected plasma emission from the in-vessel wall are critical for the performance of diagnostic system. Diagnostic issues for plasma initiation and ramp-down phases are critical for monitoring and controlling the plasmas. Impact of in-vessel stray microwave radiation even in moderate level can be detrimental for the microwave based diagnostic systems.

Country or International Organization of Primary Author

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Collaboration (if applicable, e.g., International Tokamak Physics Activities)

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