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Development and New Progress of a Universal Signal Processing Platform for Beam Diagnostics and Control

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To support the construction and upgrades of multiple large scientific facilities, several research institutions have parallelly developed specialized digital beam signal processing platforms, which have now been deployed in batches for engineering applications. However, under the current operational model—where small teams across different institutes independently conduct nearly identical hardware/software development work—there exists a lack of unified standards. This fragmentation prevents inter-institutional sharing of both hardware and software resources, while also hindering technical exchange. To address these challenges, with funding from the Major Facility Maintenance & Renovation Project of the Chinese Academy of Sciences, beam diagnostics and control teams from USTC, SARI, IHEP and IMP have jointly initiated the development of an universal signal processing platform for beam diagnostics and control. This paper presents the latest progress in this collaborative effort.

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