Development of a Combined Polarimeter-interferometer system for Non-Inductive Plasma Position Measurement in Long Pulse discharges on EAST

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Vertical position stability plays a crucial role in maintaining safe and reliable plasma operation, vertical displacement events arising from the vertical displacement instability could lead to plasma disruption and even bring damage to the devices. Generally, the vertical position is measured with inductive magnetic coils installed inside the vacuum vessel, but the integration drift effect may exist in steady state or long-pulse plasma operation. Using polarimeter/interferometer to measure plasma vertical position has been tested on EAST [1]. The comparison between non-inductive measurement and inductive flux loops shows a consistent result in a short pulse discharge. In this paper we have compared the non-inductive vertical position measurement by polarimeter/interferometer to that by inductive flux loop in 1056 seconds discharge achieved on EAST in recent campaign. It shows that non-inductive measurement is more robust than flux loop after 200 seconds if integrator is not reset to suppress integrator drift. Real-time vertical position control using non-inductive POINT system is proposed on EAST for following experiment campaign.

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