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Design of geometric phase measurement in EAST Tokamak TING

LAN, University of Science and Tech of China, HAIQING LIU, Institute of Plasma Physics, CAS, China, JIAN LIU, HONG QIN, University of Science and Tech of China — The aim of this work is to propose the optimum scheme for geometric phase measurement in EAST Tokamak. On the one hand, the experimental observation of geometric phase in plasma systems is an essential verification of the geometric phase theory by a new experimental technique. On the other hand, the measurement of geometric phase confirms geometric effect as a new system error in the existing diagnostics. The geometric phase in Faraday rotation angle for linearly polarized electromagnetic waves propagating in non-uniform magnetized plasmas is a good candidate for the first identification of geometric phase in plasma. In this work, the theoretical values of geometric phase for the probe beams of EAST Polarimeter-Interferometer (POINT) system are calculated by path integration in parameter space. Several schemes are proposed for the measurement of the geometric phase in POINT system by amplifying the geometric phase and enhancing the diagnostic resolution. To reach the conditions of the designed scheme for geometric phase measurement, the feasibility of replacing individual retro reflectors (RRs) with retro reflector array (RRA) in POINT system is verified experimentally. Corresponding results are beneficial for geometric phase measurement in EAST Tokamak.

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