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8.24 A new method to reconstruct the Bp profile in the Laser-driven Ion-beam Trace Probe (LITP) diagnostics

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The Laser-driven Ion-beam Trace Probe (LITP) is a new Bp diagnostic method, firstly proposed in 2014. The basic principle of the LITP method is as follow. Ions generated by laser-driven accelerator are injected into the tokamak, passing through the plasma and finally reached the detector on the vacuum wall. The Bp profile could be reconstructed based on the traces of ions. The ion beam has large energy and pitch angle spread so that the traces of ions with different energies cover a 2D area in the tokamak, and a tomography method is needed to reconstruct 2D Bp profiles. Here a new method based on the solutions of differential equation is proposed. Simulation results and error analysis show that the new method makes the LITP more adjustable and robust.

[1] Yang et al. Rev. Sci. Instrum. 85(11), 11E429 (2014).
[2] Yang et al. Rev. Sci. Instrum. 87(11), 11D610 (2016).

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