Initial measurements of the beam ion profile in NSTX with the Solid State Neutral Particle Analyzer array*

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The Solid State Neutral Particle Analyzer (SSNPA) array on the National Spherical Torus Experiment (NSTX) utilizes silicon diodes coupled to fast digitizers to measure the energy distribution of charge exchange fast neutral particles (35~100 keV) at four fixed tangency radii (60, 90, 100, and 120 cm) to obtain the corresponding beam ion profile. Noise reduction techniques required to operate in the tokamak environment and post-shot pulse height analysis (PHA) methods are described. The results have been compared with those on the scanning E//B type Neutral Particle Analyzer (NPA) and good agreement was achieved. The redistribution and loss of beam ions during MHD activity including sawteeth events and internal reconnection events have been observed. An experiment to study redistribution caused by fishbone instabilities is planned.

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