FY 16 Joint M&P and BP Milestone

High-Z divertor operation and performance

The NSTX-U is expected to operate with the addition of high-Z plasma-facing components (PFCs) in the outboard divertor in FY2016. The performance of the high-Z PFCs and the impact on plasma operations will be evaluated in order to assess expanded high-Z coverage in future run-years. The expected location in the outer divertor emphasizes the need for radiative divertor operation to mitigate heat fluxes incident on the high-Z PFCs and avoid melting. The integrated operations on the high-Z tiles in conjunction with heat-flux mitigation schemes (e.g. radiative gas puffing, strike-point sweeping) will be established for a range of scrape-off layer heat-flux widths. Impurity production consisting of eroded low-Z coatings and the high-Z substrate will be evaluated during these experiments. Migration of the impurities from their source locations throughout the rest of the machine will be diagnosed with a range of material and plasma diagnostics including witness plates, QCMs and the MAPP diagnostic and analyzed with interpretive codes such as OEDGE and WALLDYN. Influx of impurities into the NSTX-U core will also be evaluated alongside studies of pedestal evolution during operation on the high-Z PFCs. The severity of ELM transient heat loads on the high-Z PFCs will be evaluated to determine future requirements on mitigation schemes with expanded high-Z PFC coverage.