Poloidal Distribution of Intermittent Events (Blobs) in the Scrape-off Layer and Divertor of the National Spherical Torus Experiment (NSTX)*

R. J. Maqueda[1], S. J. Zweben[2], D. A. Russell[3], J. R. Myra[3], D. A. D'Ippolito[3], D. P. Stotler[2], and the NSTX Team

[1]*Nova Photonics/PPPL, Princeton, New Jersey 08540, USA.*
[2]*Princeton Plasma Physics Laboratory, Princeton, New Jersey 08543, USA..*
[3]*Lodestar Research Corp., Boulder, Colorado 80301, USA..*

Intermittent filamentary structures, also known as blobs, are routinely seen in the low field side scrape-off layer (SOL) of the National Spherical Torus Experiment (NSTX) [1] using Gas Puff Imaging (GPI) and Langmuir probes [2]. These filaments have similar characteristics to those observed in other toroidally confined experiments. In NSTX the contribution of blobs to the cross-field energy transport and SOL width is being studied using the 2-D fluid turbulence SOLT code [3] which uses time averaged profiles from the experiment and yields results directly comparable to the data through a *synthetic* GPI diagnostic.

Fine structured filaments are also seen on the lower divertor target plates of NSTX. These filaments, not associated with edge localized modes (ELMS), but correspond to the footprints of the turbulent blobs seen near the midplane. The fluctuation level of the neutral lithium light observed at the divertor plante, and the skewness and kurtosis of its probability distribution function, are similar to the midplane blobs; e. g. increasing with increasing radii outside the outer strike point (separatrix). In addition, their toroidal and radial movement agrees with the typical movement of midplane blobs. Furthermore, with the appropriate magnetic topology, i.e. mapping between the portion of the target plates being observed into the field of view of the midplane GPI diagnostic, very good correlation is observed between the blobs and the divertor filaments. The existence of "magnetic shear disconnection" due to the lower X-point, as proposed by Cohen and Ryutov [4], is consistent with the measurements obtained. The correlation between divertor filaments and midplane blobs is lost close to the outer strike point.

At the same time that intermittent blobs are seen in the low field side SOL, no intermittent activity is seen along the center column of NSTX, even for lower single null discharges. The deuterium (fuelling) gas puff located at the high-field-side midplane of NSTX is used to "illuminate" the inner edge of the plasma in the same way as GPI is used for the low field side midplane. This limitation to the poloidal/toroidal length of the field-aligned blob filaments will be explored within the context of magnetic shearing, even in the abscense of an X-point.

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