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Modeling of blob-hole correlations in GPI edge turbulence data[1]

J.R. MYRA, D.A. RUSSELL, Lodestar, S.J. ZWEBEN, PPPL — Gas-puff imaging (GPI) observations made on NSTX [S.J. Zweben et. al, submitted to Phys. Plasmas (2017)] have revealed two-point spatial correlation patterns in the plane perpendicular to the magnetic field. A common feature is the occurrence of dipole-like patterns with significant regions of negative correlation. In this work, we explore the possibility that these dipole patterns may be due to blob-hole pairs. Statistical methods [O.E. Garcia, et al, Phys. Plasmas 23, 052308 (2016)] are applied to determine the two-point spatial correlation that results from a model of blob-hole pair formation. It is shown that the model produces dipole correlation patterns that are qualitatively similar to the GPI data in many respects. Effects of the reference location (confined surfaces or scrape-off layer), a superimposed random background, hole velocity and lifetime, and background sheared flows are explored. The possibility of using the model to ascertain new information about edge turbulence is discussed.

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