3D modeling of blobs with the BOUT++ code[1] JUSTIN ANGUS, UCSD, MAXIM UMANSKY, LLNL, SERGEI KRASHENINNIKOV, UCSD — Blobs are filamentary structures found in the edge region of tokamaks during L-mode discharges and can contribute to more than 50% of the plasma particle transport near the last closed flux surface. Most of the theory and simulation of blobs is done in the 2D limit by invoking different closure schemes of the 3D dynamics along the field line. However, 3D dynamics can be very important and alter the blobs speed and lifetime, which in turn alters the particle and energy transport of the blobs. For example, a finite resistivity along the field line can lead to standing drift waves along the field line and a finite density gradient along the field line can lead to a potential difference along the field line that wants to spin the blob. These 3D effects and more are investigated here analytically and numerically using the 3D fluid BOUT++ code.

Justin Angus
UCSD

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