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New approach in multi-fluid modeling of edge plasma transport with high intermittency due to blobs and ELMs A.YU. PIGAROV, S.I. KRASHENINNIKOV, UCSD, T.D. ROGNLIEN, LLNL — Strong fluctuations of edge plasma parameters via blobs result in a strong spatiotemporal variation of all nonlinear functions of plasma parameters (e.g. ionization rate, heat/momentum fluxes, plasma-wall interactions), hence, causing serious problems with both interpretation of experimental data and modeling using 2-D fluid transport codes based on averaged plasma parameters. In new modeling approach we include spatiotemporal features of blobs and ELMs using the 2-D transport code UEDGE in a time-dependent mode. Our model is based on multi-fluid simulation of an ensemble of plasma "macro-blobs" appropriately seeded in the edge plasma according to experimental statistics of blobs. The model properly projecting inherently 3-D filamentary structures associated with blobs on the 2-D poloidal geometry. We report the initial results from UEDGE modeling of "macro-blob" dynamics and non-linear interaction with background plasma. The impact of model assumptions and initial conditions on individual blob dynamics and background plasma will be discussed. Next steps of this work are (1) development of 3-D tools performing the spatiotemporal averaging to calculate the signals of tokamak diagnostics from the UEDGE plasma with blobs; (2) simulation of ensemble of "macro-blobs"; and (3) benchmarking the approach against experimental data from current tokamaks.

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