1152-35-388 **Dallas Albritton*** (albri050@umn.edu). *On local boundedness of passive scalars advected by divergence-free drifts.*

We consider a passive scalar θ in a divergence-free velocity field $b = b(x,t)$, for example, as describes the 2d Navier-Stokes equations in vorticity form. The regularity of the corresponding parabolic equation $\partial_t\theta - \Delta\theta + b\cdot\nabla\theta = 0$ has experienced renewed interest in the past decade, in light of Caffarelli and Vasseur's proof of regularity for the SQG equation. The De Giorgi-Nash-Moser theory implies that, when the drift b belongs to certain "critical" spaces (such as $L^\infty_t L^n_x$), weak solutions are Holder continuous. However, when b belongs to certain supercritical spaces, it is known that solutions may be discontinuous, yet they remain bounded. In this talk, we present sharp conditions on the drift b such that weak solutions are locally bounded and satisfy Harnack's inequality. The proof relies on a dimension reduction technique of Frehse-Ruzicka and Kontovourkis, who investigated the elliptic case. We present new counterexamples to demonstrate the optimality of our results. (Received September 09, 2019)