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Non-decaying solutions to the critical surface quasi-geostrophic equations with symmetries

We discuss a theory of self-similar solutions to the critical surface quasi-geostrophic equations due to Dallas Albritton and Z.B. In particular, we examine a construction of self-similar solutions for arbitrarily large data in various regularity classes—including some large, unbounded, non-decaying functions—and demonstrate, in the small data regime, uniqueness and global asymptotic stability. These solutions are non-decaying at spatial infinity, which leads to ambiguity in the drift velocity. This ambiguity is corrected by imposing m -fold rotational symmetry. The self-similar solutions of interest lie just beyond the known well-posedness theory and are expected to shed light on potential non-uniqueness, due to the possibility of symmetry-breaking bifurcations.