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The genesis of streamwise-localized solutions from globally periodic travelling waves in pipe flow MATTHEW CHANTRY, University of Bristol, ASHLEY WILLIS, University of Sheffield, RICH KERSWELL, University of Bristol — At intermediate Reynolds numbers, pipe flow exhibits spatio-temporal turbulence, where localized patches of turbulence may spread, split or decay. To construct a dynamical systems framework for this behaviour requires streamwise-localized solutions embedded within the turbulent dynamics. To date a single localized periodic orbit has been found, in contrast to the large number of known downstream-periodic solutions. Here we find the origin of this localized solution in a symmetry-breaking Hopf bifurcation from a known downstream periodic travelling wave. This bifurcation structure is found in a second symmetry subspace leading to new localized solutions. Our results indicate that localized versions of every downstream-periodic travelling wave should be expected.

Matthew Chantry
University of Bristol

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