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Exact coherent structures for the turbulent cascade BRUNO ECKHARDT, Philipps-Universität Marburg, STEFAN ZAMMERT, TU Delft — The exact coherent structures that are connected with the transition to turbulence in interior flows usually extend across the full height of the domain. Using exact coherent states that are localized in the shear direction together with scaling ideas for the Navier-Stokes equation that combine length and Reynolds number, we show how such large scale structures can be morphed into smaller scale coherent structures. As the Reynolds number increases, more of these states with ever smaller scales appear, all the way down to the Kolmogorov scale. We present the structure and dynamical properties of several families of exact coherent solution in plane Couette flow, with different degrees of spatial localization: Some of them remain localized in the center and help to build the turbulence cascade, others are localized near the walls and contribute to shaping the boundary layer profile.

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