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Connecting Ellipses to Rectangles in Passive Scalar Transport MANUCHEHR AMINIAN, Colorado State University, FRANCESCA BERNARDI, ROBERTO CAMASSA, UNC Chapel Hill, DANIEL HARRIS, Brown University, RICHARD MCLAUGHLIN, UNC Chapel Hill — We study how passive scalar transport in Poiseuille flow is affected by the shape of the pipe cross section. Our previous results have established nontrivial dependence of the skewness of the tracer distribution upon the pipe shape. Previously, we have studied the families of rectangles and ellipses, with the behavior past diffusive timescales primarily depending on aspect ratio, and the type of geometry being secondary. However, at timescales well before the diffusion timescale, the family of ellipses is distinct compared to rectangles. We investigate this phenomenon by studying a collection of exotic cross sections connecting the ellipses and rectangles, using a combination of theoretical and computational tools.

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