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Structures in Transitional Taylor-Couette Flows Identified using POD STAVROULA BALABANI, EBOSHOGWE IMOMOH, JONATHAN DUSTING, Experimental and Computational Laboratory for the Analysis of Turbulence (ECLAT), King's College London, Strand, London WC2R 2LS, UK — The flow in the gap between concentric cylinders, or Taylor-Couette flow, has been used to study transition to turbulence for decades, and is also utilised for various biotechnological and industrial processes. Transitional flow states depend highly on vessel geometry; they are also three-dimensional and often time dependent limiting the use of experimental techniques for their characterisation. In this talk the transition to turbulence in a Taylor-Couette flow is studied by means of time resolved PIV velocity fields and Proper Orthogonal Decomposition (POD). It is found that for the particular geometry studied the transition to turbulence occurs via a quasi periodic regime characterised by a fast moving azimuthal wave (FMAW). Aspects of the FMAW structure, such as a series of co-rotating vortices that increase in strength away from the endwalls, are also revealed by spatially resolved POD.

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