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Helical Vortex Characterization in Swirling Jets from Planar Measurements[1] BENJAMIN EMERSON, TIM LIEUWEN, Georgia Institute of Technology — The fluid mechanics of swirling jets are highly three-dimensional, but most state of the art measurement capabilities are only planar. This work demonstrates an experimental data analysis methodology for swirling jets. The methodology is implemented on planar velocity field data to interpret the dynamical, three-dimensional topology of the velocity field. The methodology blends physical understanding of reacting swirling jets with clues that are present in stereoscopic particle image velocimetry data to infer a helical vortex tube inclination angle. With this inclination angle, the planar measurement data can be revolved to re-construct the three-dimensional velocity field.

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